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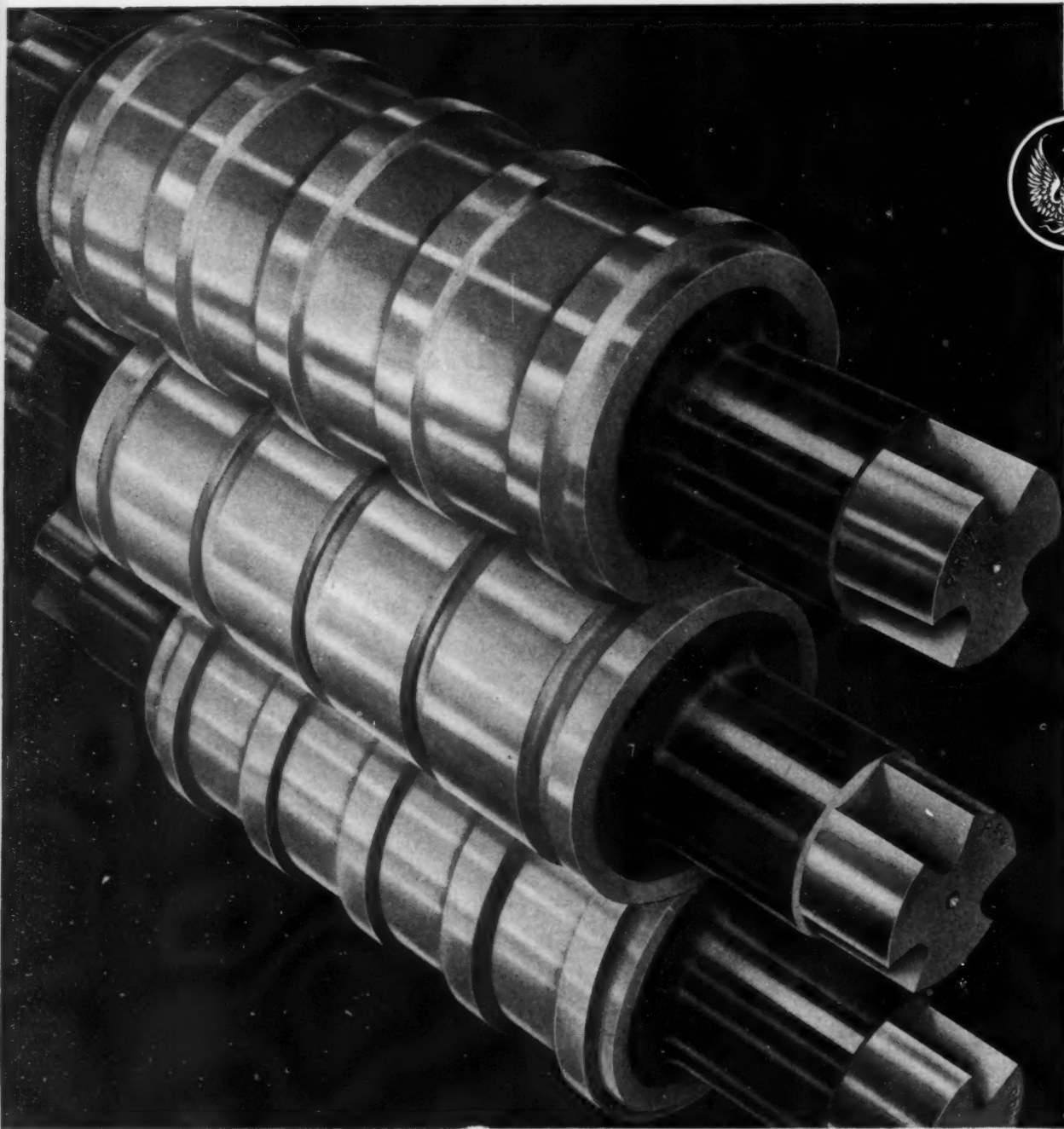
THE IRON AGE

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▲▲▲ THE IRON AGE ▲▲▲

DECEMBER 14, 1939

ESTABLISHED 1855

Vol. 144, No. 24

Cockeyed Bookkeeping And Cockeyed Economics

THE proposal to camouflage the growing national debt and deficit by putting American defense costs into account A and other government costs into account B is perhaps the silliest and most transparent of all of the "schemes" hatched in the past seven years. It may fool some voters, but it will fool no taxpayers.

The idea, of course, as presented to the public is that if we spend money for defense purposes, say \$500 million, this should be paid "as we go" through special taxation and not considered part of the general budget.

Most business men will favor the principle of "pay as you go," for all current or operating expenses. But because government has been fearful of the effect on votes if current expenses were to be fully offset by taxes, we have been piling up a deficit during the entire Roosevelt Administration and passing it along cheerfully to our children in the form of a tremendous increase in national debt.

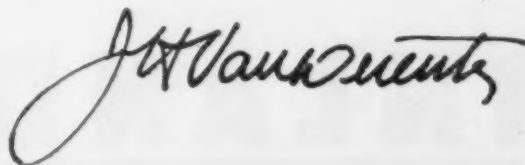
While it is a good business principle to pay current operating costs "as you go," it is an equally sound business principle to amortize capital investments over a period of years. Thus when a company buys a machine that will operate profitably for 10 years, it does not charge off the entire cost at the time of purchase but spreads it over the 10-year period. This same principle, of course, applies to the funding of capital investments of all kinds, either publicly or privately.

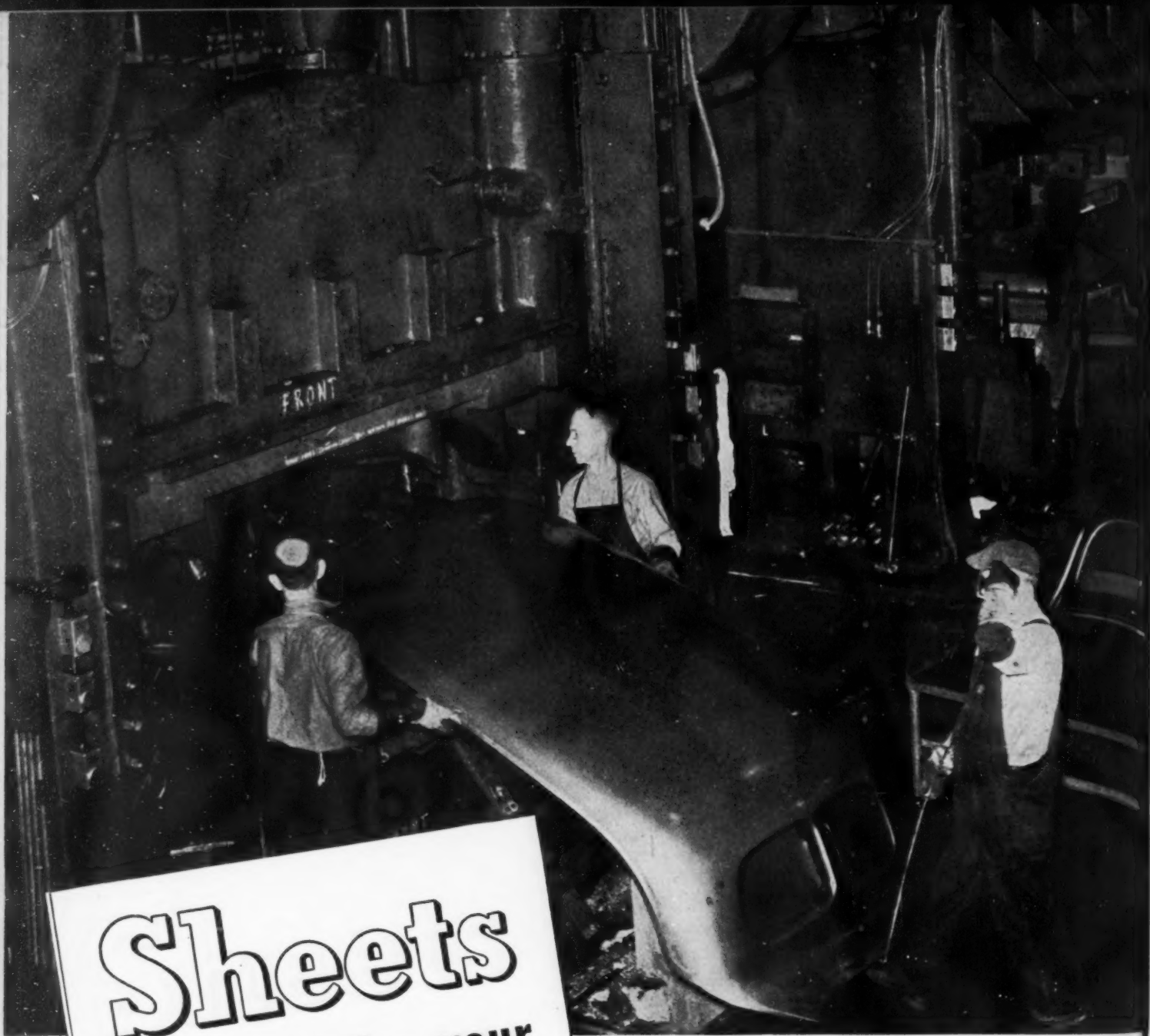
What would you think of the soundness of any business executive who proposed to reverse this established process and to amortize current operating costs while charging off capital investments in the year they were made?

That is exactly what this proposal to pay armament costs "as we go" amounts to.

Our armament program is a long term investment program in capital goods. It is one of the very few "investments" that has been made by this Administration that will benefit future generations. Certainly national security is the foundation of social security. Yet, it is proposed to treat this as an operating current cost item, while at the same time amortizing this year's leaf raking, aesthetic dancing and paint daubing, boondoggling over future generations.

Of course, the proposal is an intellectually dishonest one. Every junior accountant in government service, as elsewhere, knows that. It is a scheme to keep the Administration from bumping its head on the \$45 billion debt ceiling, a scheme to take the easy way of more taxes instead of the hard way of some economies. Cockeyed bookkeeping is a fit companion for cockeyed economics!





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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Strain ANNEALING

By FREDERIC J. ROBBINS

Bliss & Laughlin, Inc.

THIS report shows how a combination of cold working in different amounts and low temperature annealing treatments can produce a desirable combination of cold drawn bar characteristics, high strength and ductility, along with economy of

ultimate cost and facility of production. In this, the first section of a two-part report, the author tabulates data showing the effect of different drafts on the physical properties of various SAE steels.

temperature annealing treatments to produce a desirable combination of cold drawn bar characteristics, high strength and ductility along with the economy of ultimate cost and facility of production holds some excellent possibilities to the designing engineer and general manufacturer.

THE change in physical properties resulting from cold working of steel has provided an excellent subject for a great many interesting papers. At the same time the investigations have proved to be of great benefit to industry in providing a material whose ability to withstand stresses lies above that of hot rolled steel and for a great many jobs has eliminated the necessity for quenching and tempering.

The effect of low temperature annealing upon steels which have been cold worked has also proved to be of benefit to industry since by this combination of straining and strain relieving varied results can be produced, which widen a great deal the range of applications for material made by this

means and result in an economy of production costs. For instance, cold drawn bars can be strain annealed to produce a completely strain-free structure with no danger of warping in subsequent operations. There is the same balance of strength and ductility as before cold working—yet the finish, close size tolerance and so forth, which are considered characteristic of cold drawn bars, are all retained. Further, there are a number of parts being manufactured whose service requirements are somewhat above those which can be met by cold drawing alone and yet are not sufficiently high to warrant the expense of heat treatment.

The use of a combination of cold working in different amounts and low

It is the intention of the writer to explain in this paper the methods of production of steel bars made in this way, the results produced on different steel analyses by varying temperatures of annealing and to inquire briefly into the possibilities of application of steels which have been subjected to such treatments.

To the user of cold drawn bars the application of strain annealing treatments can be considered to fall into three general classifications determined by the final result in production and application, as well as when measured by standard tensile and impact tests. These classifications are:

- (1) Complete relief of all cold working strain.
- (2) Relief of cold working strain to a limited degree for increasing the ductility of the material.
- (3) Relief of strain in heavily cold

worked steel for the purpose of obtaining tensile properties between cold drawn and heat treated properties.

It is to be noted that such treatments preserve intact some of the nature of cold drawn steel and modify or enhance other features.

Characteristics of Drawing Operation

A brief discussion of the method of cold working the bars is necessary for an understanding of the nature of the material prior to the application of the annealing treatment.

Cold drawing is performed upon all analyses of steel and results in setting up internal strain in all cases. The change in mechanical properties resulting from this strain is quite considerable for all types although certain heats of a given analysis may possess characteristics making them more susceptible to cold working than others. This subject has been rather well covered by S. L. Case, in the article "Work Sensitivity," *Metal Progress*, November, 1937.

The higher carbon steels, because of their higher hot-rolled hardnesses, produce a higher cold-drawn hardness than do the lower carbon steels. The work-hardening characteristics of the other elements in steel, such as manganese, are also rather well understood from the various data which have been published for quite a long time. It is not to be expected that Bessemer screw stock or the low carbon open hearth steels will develop physical

properties comparable with the higher carbon analyses regardless of the treatment employed. Therefore, in attaining the results just indicated any grade of steel, depending upon the fabricating and ultimate requirements of the job, can be processed under (1), (2), or rarely (3). However, for practical applications in (3), steels which are generally heat treated, such as SAE 1040, 1045, X-1335 or similar grade, must be used to obtain mechanical

properties sufficient for the intended purpose. In other words, the selection of a suitable grade of steel to be cold-drawn and strain-annealed for any given application is dependent upon its net possibilities and the production and service requirements of the job.

Thus, for nuts which are to be made on the automatic screw machine, a cold-drawn bar can be used to much greater satisfaction as regards processing and fabrication costs than can

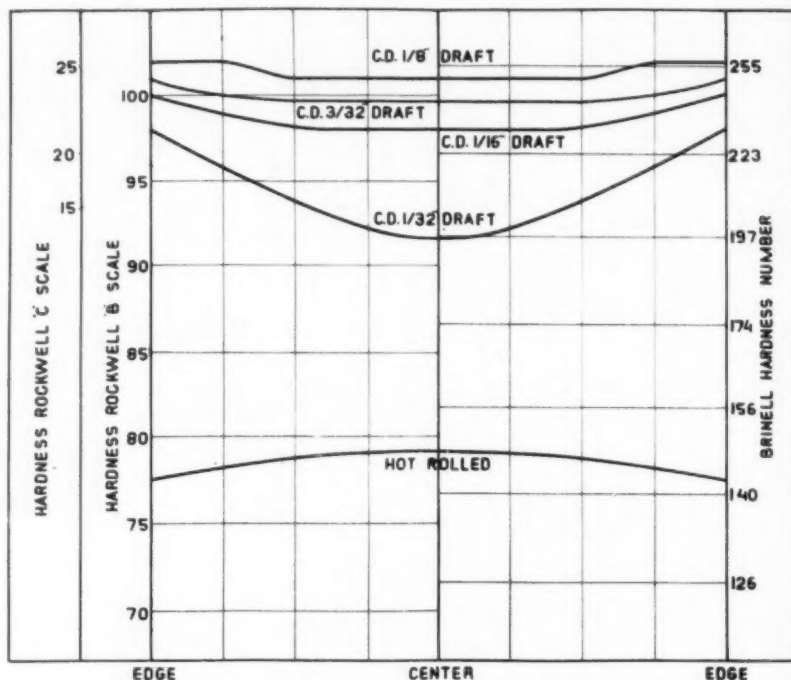


Fig. 2—SAE 1112 steel. Variation of hardness with draft.

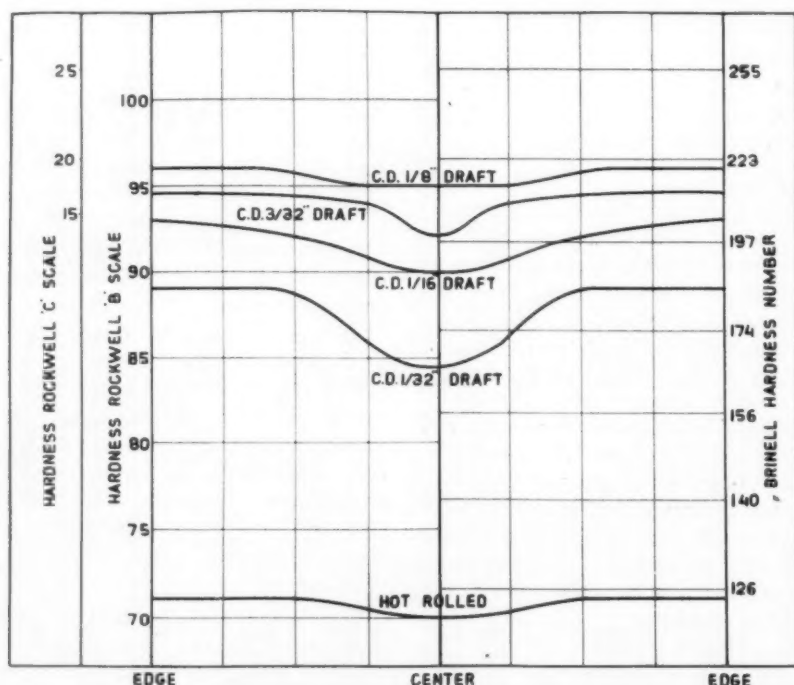


Fig. 1—SAE 1020 steel. Variation of hardness with draft.

any other type of finished bar. At the same time, it is frequently found that the cold-drawn properties do not fall within the desired specification limits, especially as regards ductility, which is usually that of hot rolled steel. Strain-annealing at a temperature determined by pilot tests can be employed on these cold-drawn bars to effect an increase in ductility and still not destroy those effects of cold drawing which make such a product especially suitable for automatic screw machine work. Such a job falls into class (2).

For years an automotive drive shaft has been used, the physical specification for which was originally made by a simple heat treatment of the steel, which is a medium carbon, manganese open hearth stock. However, it was found much more economical to use a strain-annealing operation after cold drawing to produce precisely the same mechanical properties and at the same time maintain close size tolerance.

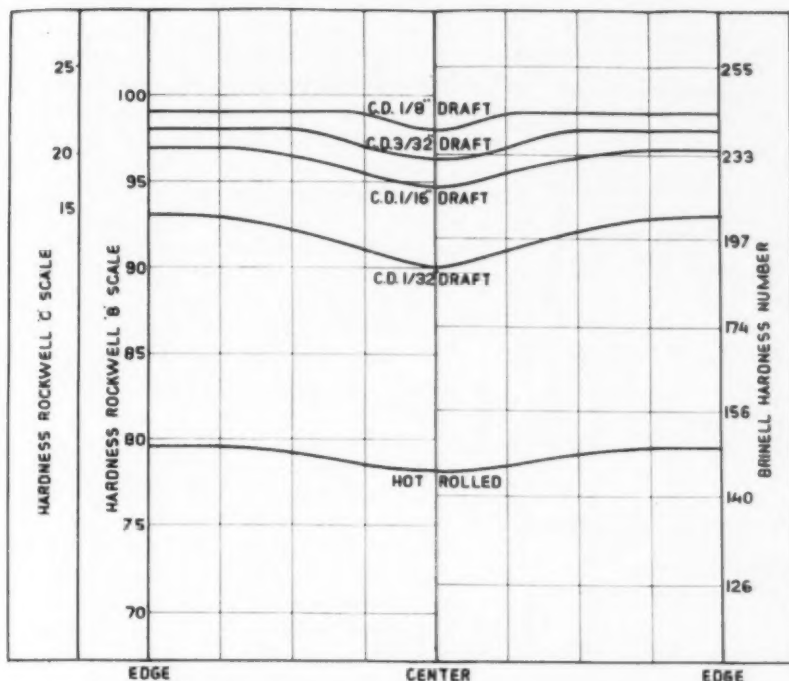


Fig. 3—SAE X-1315 steel. Variation of hardness with draft.

straightness and good finish. This job falls into class (3).

Generally speaking those jobs falling into class (1) are those on which the problem is the elimination of warpage or distortion either in the machining operations or in heat treatment. Any section which is subject to intricate or delicate machine work or is a difficult one to heat treat without distortion, can be made from cold drawn strain-annealed bars of any grade with a definite assurance of the elimination of processing difficulty caused by strain.

The principal difference in processing to produce the flexibility desired for strain-annealed characteristics lies in the amount of cold reduction imposed upon the bars in the cold drawing from hot rolled bars. The amount of cold reduction is denoted as draft and is measured as fractions of an inch or as a certain per cent of reduction in cross-sectional area. Heavier drafts or greater per cent of reduction result in greater amounts of strain being set up and the resulting physical properties are a function of this strain and its subsequent relief.

The effect of different drafts, and consequently the amount of strain set up, can for all general purposes be measured by the change in hardness which occurs as a result of setting up such strain. The metallurgical aspects of the development of hardness as a result of strain have been discussed in considerable detail by such well known authorities as Beilby, Rosenhain, Heyn, Benedicks and others. It is not

the intention of the present writer to discuss these subjects beyond pointing out that cold reduction carried beyond the extent where hardness increase occurs will result in inter-granular

rupture. Thus, in cold drawing, the amount of cold working must be kept below this point. It is this fact which makes an anneal above the recrystallization temperature necessary when very large amounts of reduction are to be made, as in wire drawing. This is not the case in cold drawn bars where the per cent of reduction is low as compared with wire.

Rockwell Measures Strain

The Rockwell hardness test provides a suitable method for indirectly measuring the amount of strain. The "B" scale using a 1/16 diameter ball and 100 kg. load is used until the hardness rises into the range of the "C" scale, at which point 150 kg. is imposed upon the diamond cone. The hardness tests are made upon a ground transverse section of the bar on perpendicular diameters, unless the section is small—then they are taken by the method used by Burns, Moore and Archer, and explained in their paper, "Quantitative Hardenability," Transactions of The American Society for Metals, Vol. 26, 1938.

Figs. 1, 2 and 3 show the effect of varying amounts of draft on SAE 1112, 1020 and X-1315 steels of analysis shown in Table I. It is to be

TABLE I
Analysis of Steels Shown in Figs. 1, 2 and 3

Grade	Carbon	Manganese	Phosphorus	Sulphur	McQuaid-Ehn Grain Size
SAE 1020	0.18	0.46	0.014	0.028	Coarse
SAE 1112	0.13	0.92	0.110	0.147	Coarse
SAE X-1315	0.19	1.30	0.027	0.127	Coarse

TABLES II to IV
Effect of Various Drafts on Physical Properties of SAE 1020, 1112 and X-1315 Steels

	Tensile Strength, Lb. per Sq. In.	Yield Strength, Lb. per Sq. In.	Elongation in 2 In.	Reduction of Area, Per Cent	Charpy Impact, Ft.-Lb.
Table II (SAE 1020 Steel)					
Hot rolled	64,300	48,000	36.0	67.8	52.7
Cold drawn, 1/32 in. draft	75,800	65,000	22.0	62.9	49.7
Cold drawn, 1/16 in. draft	83,200	74,000	18.5	60.7	43.5
Cold drawn, 3/32 in. draft	88,000	79,200	15.0	58.2	35.7
Cold drawn, 1/8 in. draft	90,500	81,700	15.0	57.6	33.8
Table III (SAE 1112 Steel)					
Hot rolled	71,400	54,000	33.5	59.2	30.2
Cold drawn, 1/32 in. draft	88,200	78,500	18.5	50.1	17.4
Cold drawn, 1/16 in. draft	97,200	89,000	15.5	47.0	15.8
Cold drawn, 3/32 in. draft	102,000	95,200	14.5	44.3	14.6
Cold drawn, 1/8 in. draft	105,000	98,600	12.5	43.7	11.6
Table IV (SAE X-1315 Steel)					
Hot rolled	74,300	52,500	36.5	66.4	51.5
Cold drawn, 1/32 in. draft	84,250	72,500	19.0	60.4	37.5
Cold drawn, 1/16 in. draft	92,000	80,000	14.5	58.4	32.8
Cold drawn, 3/32 in. draft	97,300	80,500	13.5	57.4	32.3
Cold drawn, 1/8 in. draft	99,300	81,000	14.0	56.9	29.2

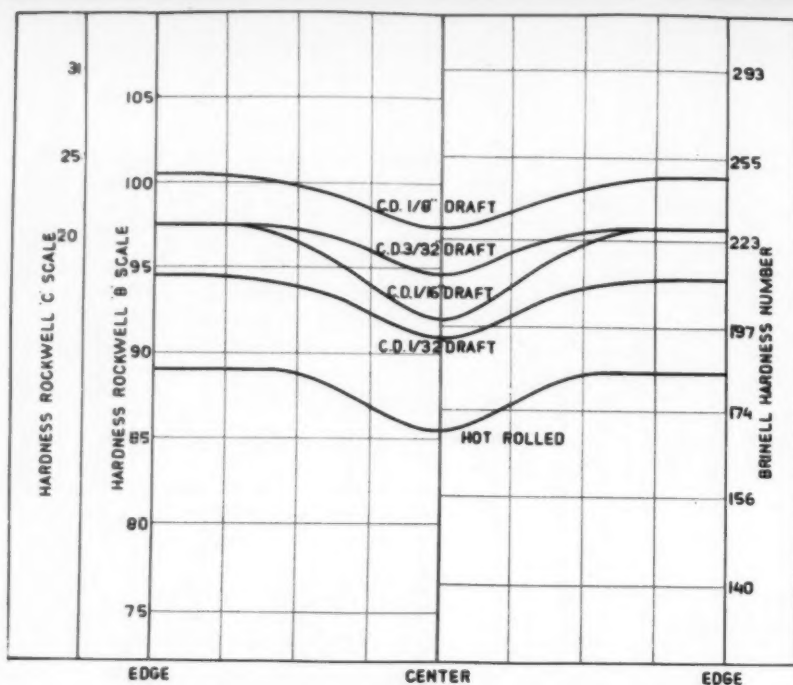


Fig. 4—SAE X-1335 steel. Variation of hardness with draft.

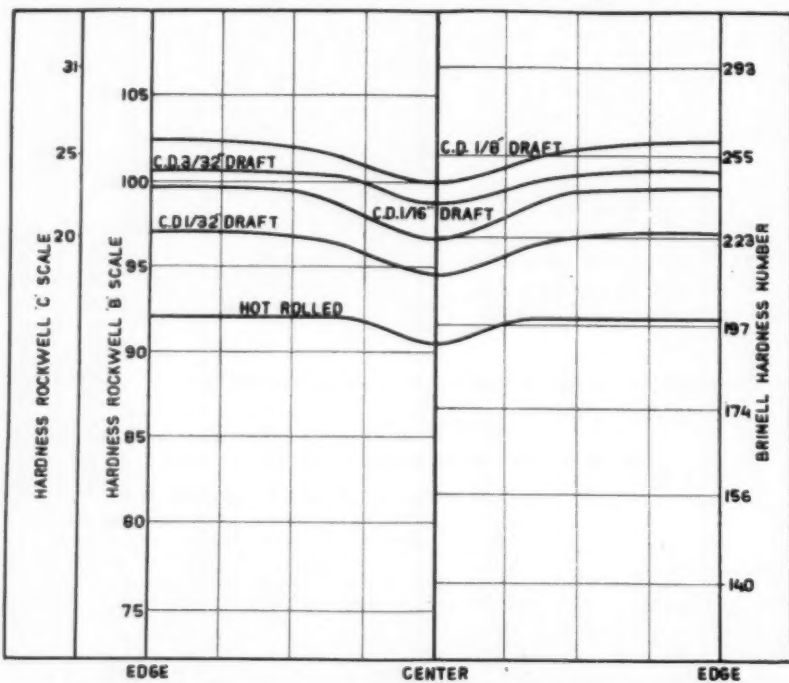


Fig. 5—SAE 1045 steel. Variation of hardness with draft.

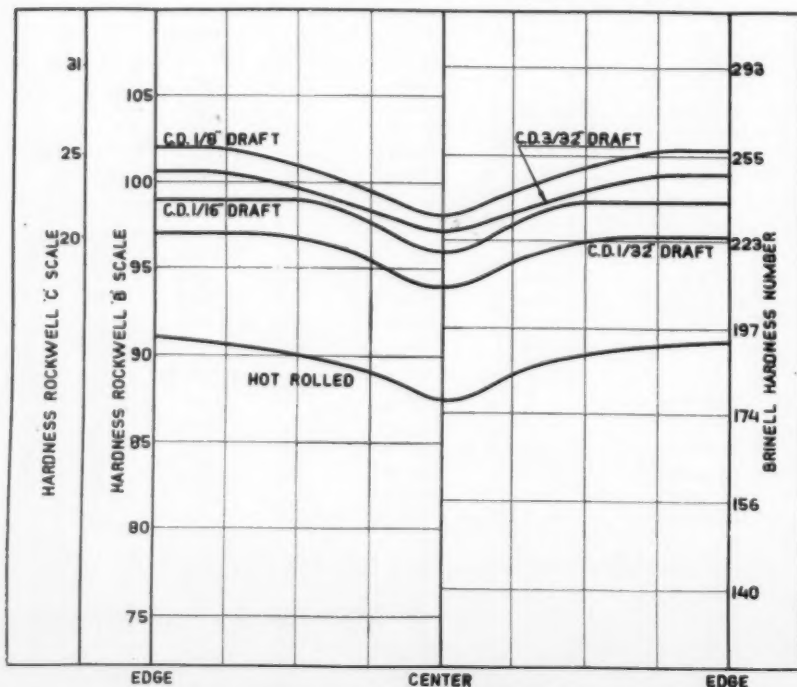


Fig. 6—Leaded 1045 steel. Variation of hardness with draft.

noted that the first 1/32-in. draft shows the greatest amount of increase in hardness and that subsequent increasing drafts result in less increase. The center of the bars at first show less increase in hardness than the bar surfaces, but as draft is increased this lag is taken up and the effect of cold-work is eventually approximately equal throughout the section. The implications of this seem to have relatively little practical application, except as regards the stiffness of the bar and its strength in full section as might be applied to certain industrial jobs.

Tables II, III and IV show the effect upon mechanical properties of the varied amounts of draft on the same steels as in Figs. 1, 2 and 3. Attention here should be called to the fact that heavy draft has had a rather profound effect upon the ductility of the steel, particularly where the steel is very susceptible to cold working, as in the case of the Bessemer screw stock. This increased brittleness does have a beneficial effect upon machining character, especially of the SAE 1020 for certain jobs, although a change in grade will usually give more

TABLES VI
Effect of Varying Drafts on Mechanical Properties

	Tensile Strength, Lb. per Sq. In.	Yield Strength, Lb. per Sq. In.
Table VI (SAE X-1335 Steel, Hot Rolled and Cold)		
Hot rolled	92,000	57,000
Cold drawn, 1/32 in. draft	97,000	60,500
Cold drawn, 1/16 in. draft	105,500	72,000
Cold drawn, 3/32 in. draft	109,250	68,000
Cold drawn, 1/8 in. draft	118,000	81,000

Table VII (SAE 1045 Steel, Hot Rolled and Cold)		
Hot rolled	109,100	57,500
Cold drawn, 1/32 in. draft	112,400	68,600
Cold drawn, 1/16 in. draft	117,600	78,600
Cold drawn, 3/32 in. draft	123,300	78,800
Cold drawn, 1/8 in. draft	130,400	85,400

Table VIII (SAE 1045, Leaded Steel, Hot Rolled)		
Hot rolled	98,600	59,800
Cold drawn, 1/32 in. draft	106,500	64,000
Cold drawn, 1/16 in. draft	113,500	67,000
Cold drawn, 3/32 in. draft	120,000	72,750
Cold drawn, 1/8 in. draft	127,750	79,500

Table IX (SAE X-1335 Steel, Cold Drawn)		
Cold drawn, 1/8 in. draft	110,700	68,000
Cold drawn, 1/4 in. draft	133,200	82,000
Cold drawn, double draft, 1/8 in. each	125,500	83,200

Table X (SAE Bal-Cut Leaded 1045 Steel, Cold Drawn)		
Cold drawn, 1/8 in. draft	116,500	73,400
Cold drawn, 1/4 in. draft	130,200	82,800
Cold drawn, double draft, 1/8 in. each	130,600	84,400

and wider beneficial results. Extra drafting in cold drawing of these types of steels is not considered to possess any industrial advantages except in a very few isolated instances.

The various curves in Figs. 4 to 8 inclusive illustrate the effect of different drafts upon SAE X-1335 and 1045 and upon leaded 1045 steel. The reason for including leaded steel in this group will become readily apparent when considering the machinability of these steels, which will be discussed more in detail below. The analyses of these steels are shown in Table V.

Figs. 7 and 8 illustrate the effect of taking single drafts of $\frac{1}{8}$ in. and $\frac{1}{4}$ in., and of a double draft of $\frac{1}{8}$ in. making a total of $\frac{1}{4}$ in.

From the increase in hardness noted in these curves resulting from the different drafts, it is evident that increasing amounts of strain are set up within the steel. Upon this factor is, of course, dependent also the development of mechanical properties. A more complete picture therefore requires the examination of Tables VI to X, showing these characteristics of

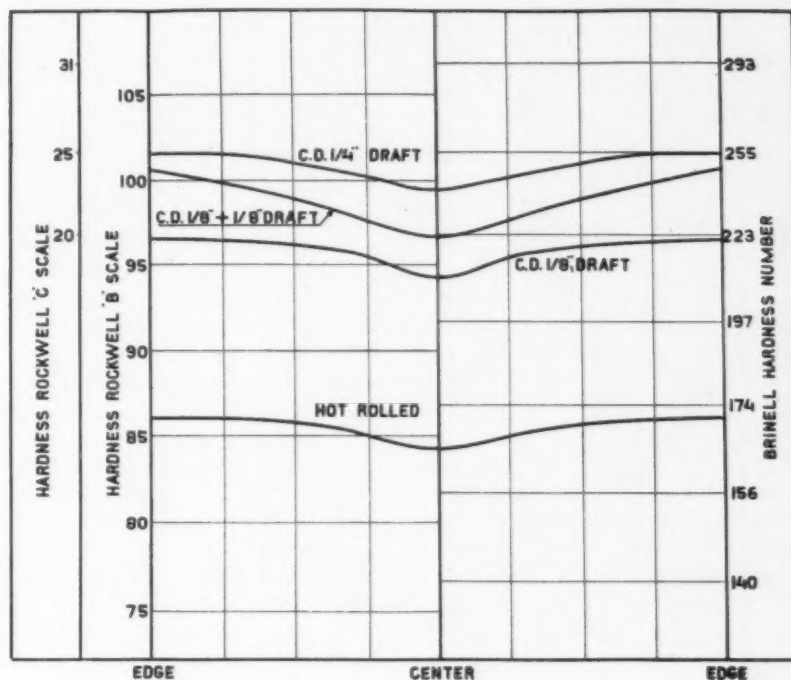


Fig. 7—SAE X-1335 steel. Variation of hardness with draft.

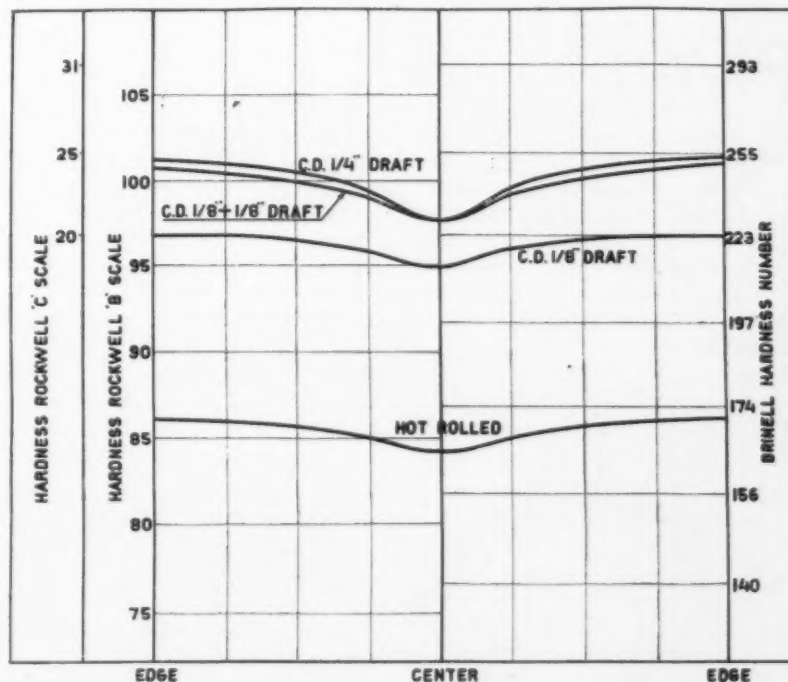


Fig. 8—Leaded 1045 steel. Variation of hardness with draft.

TO X of SAE X-1335, 1045 and 1045 (Leaded) Steels

Proportional Limit, Lb. per Sq. In.	Elonga- tion in 2 In.	Reduction in Area, Per Cent	Charpy Impact, Ft.-Lb.
--	-----------------------------	-----------------------------------	------------------------------

Drawn)			
27.5	58.9	...	...
23.0	56.6	28½-28½	...
15.5	51.8	27 -24	...
14.5	51.5	26 -24	...
13.0	48.4	21 -19	...

Drawn)			
81,000	24.5	51.8	...
19.0	47.8	20½-22	...
15.0	44.0	18 -19	...
12.5	43.7	18 -16	...
11.5	38.3	14 -13½	...

and Cold Drawn)			
60,000	25.0	44.9	24½-27
19.0	46.1	22 -22½	...
12.5	43.0	18½-18½	...
12.5	40.1	18½-18½	...
11.5	37.0	13½-14	...

14.0	47.5	22½-25½
11.0	41.3	20 -18½

12.5	44.9	19 -20
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11.0	40.4	16½-17
9.0	31.6	11 -10

9.0	30.2	9½-10
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TABLE V

Analysis of the Steels Shown in Figs. 4 to 8 Inclusive

Grade	Carbon	Manga- nese	Phos- phorus	Sulphur	Silicon	Lead	McQuaid-Ehn Grain Size
SAE X-1335 (as in Fig. 4).....	0.34	1.40	0.014	0.112	0.08		Coarse grain
SAE 1045 (as in Fig. 5).....	0.44	0.85	0.018	0.022	0.216		Fine grain
Leaded 1045 (as in Fig. 6).....	0.46	0.79	0.018	0.029	0.244	0.204	Coarse grain
SAE X-1335 (as in Fig. 7).....	0.34	1.30	0.016	0.112	0.04		Coarse grain
Leaded 1045 (as in Fig. 8).....	0.43	0.77	0.013	0.023	0.24		Coarse grain

the same steels. In each case the yield strength has been determined by the offset method, using 0.1 per cent offset.

Tables VI to X inclusive give the mechanical properties resulting from the different drafts imposed upon these steels. In each case, of course, the increase in tensile and yield follows the increase in hardness noted in the Figs. 4 to 8, while the decrease in elongation and reduction of area is of the same order. Impact strength shows a loss for each unit increase of draft. All of these changes in physical character are well understood, and while they do not follow any apparent rule and law, these figures show that at these reductions there is no unusual deviation from the expected increases and decreases.

An examination of these figures

shows that no very great flexibility of result can be expected from *changes in draft only*. Limitation of equipment and increasing costs as well as the lack of response in increasing sizes, force the conclusion that an attempt to achieve the aim set up in (3) is almost impossible through cold working alone. The stress-strain curves made in these tests show a typical cold-drawn curve bending away gradually from a straight line and with no perceptible "kneeing" effect. The proportional limit is, therefore, difficult to obtain and is low. This fact has little commercial value but it does show a considerable amount of strain present in the specimen, so that from a practical standpoint each further increase in stress occurring in service makes failure

more imminent. In order to eliminate this strain and make such material capable of resisting greater stress in actual service conditions, a low temperature anneal has been resorted to for a considerable time.

Naturally steel in this strained condition can be subjected to a wide range of temperature up to that point where all the effects of cold working have been removed, as in attaining (1). This temperature is found to be approximately 1200 deg. to 1300 deg. F. Below that, varying amounts of the strain set up will be relieved and varying effects upon the mechanical properties produced.

Ed. Note:—Next week the author concludes with specific data on the physical properties of steels cold drawn various amounts and then strain annealed.

Refractory Radiant Tubes Developed

THE alloy radiant tube type of annealing cover for pack heating steel sheets has now firmly established itself in steel mill practice. There are certain applications, however, where alloy tubes have experienced difficulty in standing up under the required high operating temperatures. One of these applications is the annealing of silicon steel sheets for transformer, armature and motor laminations.

What is said to be a commercially practicable refractory radiant heating tube has been developed for this application by the Gas Machinery Co., Cleveland, and has been found to be safe for temperatures considerably in excess of 2500 deg. F. The special refractory of which this tube is built has a conductivity 10 to 12 times that of fire clay refractory and, as a transmitter of radiant heat, is said to be comparable to the conventional alloy tube.

The accompanying illustration shows the inside view of an annealing furnace of the cannon-ball type in which these refractory radiant heating tubes have been built. This furnace has interior dimensions of approximately 15½ x 11 x 5½ ft.

For the past several months it has been in operation in the plant of the Follansbee Brothers Co., Follansbee, W. Va.

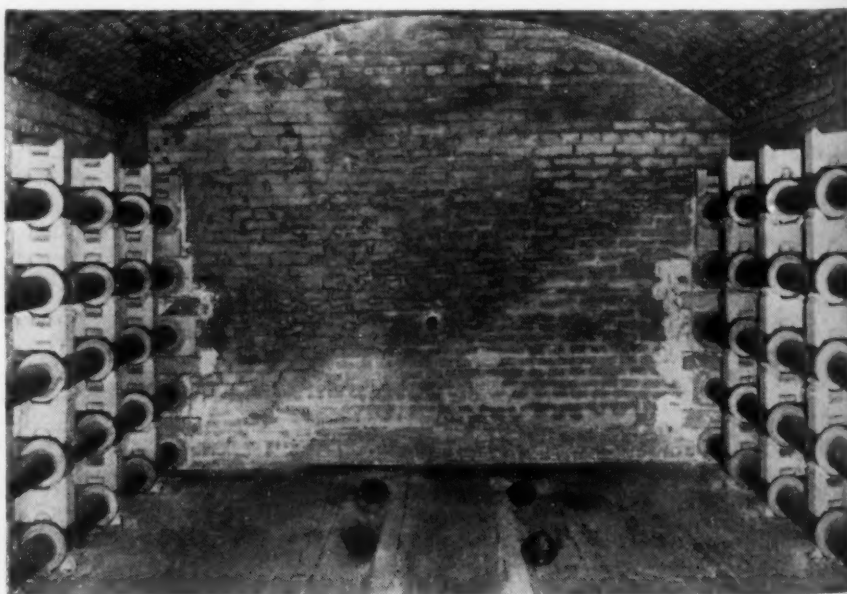
The tubes are fired with low pressure natural gas, special diffusion type

burners being employed. The design is such that uniform temperature distribution can be maintained in each tube from end to end of the furnace, over a wide range of operating temperatures. Sub-atmospheric pressures are maintained within the tubes so that there will be no possibility of leakage from the tubes to the heating chamber under normal operating conditions.

The tubes are horizontally applied in order that any tube or combination of tubes can be shut off as required, in order to provide positive control of heat application from top to bottom

of the charge. As a usual procedure, when the charge approaches the soaking temperature, the upper tubes are shut off and heat application is confined entirely to the lower portion. A considerable degree of flexibility of heat application is therefore possible for a range of annealing cycles.

Operating results are said to be very satisfactory. Temperature uniformity throughout all parts of the pack of sheets is under extremely close and constant control, and sheets are being produced with excellent physical and electrical characteristics.



Press Brake

Pays Dividends

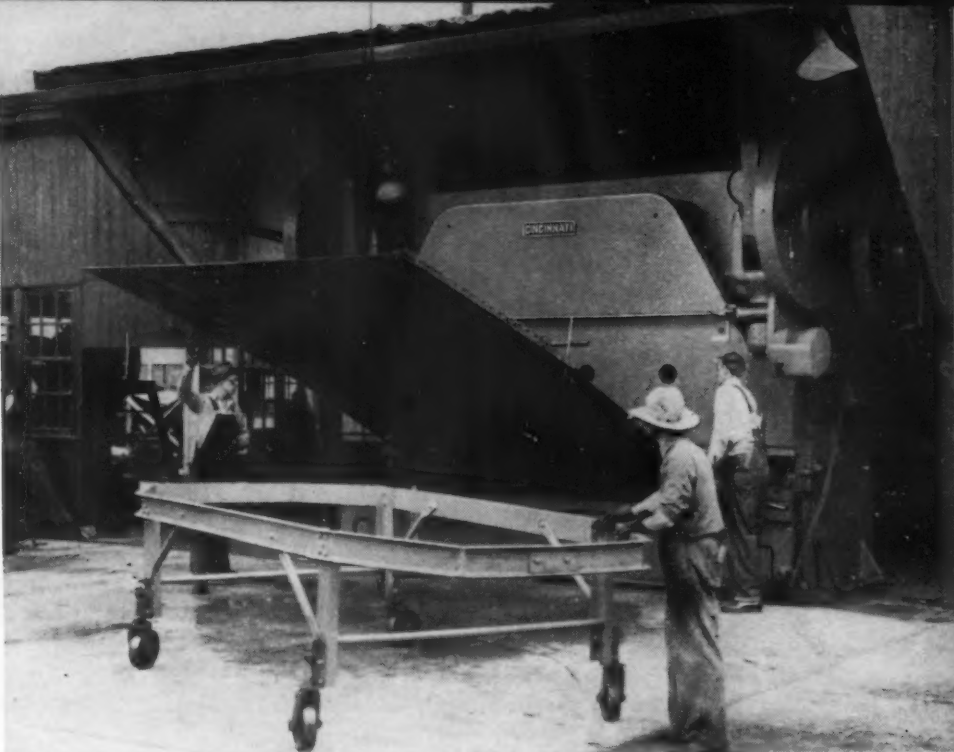
In Car Building

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IN planning a construction program of 1800 hopper cars, the mechanical department of one of the country's leading railroads was confronted with providing 18,000 car side stakes. Specifications called for multiple punching 45 11/16-in. diameter holes in 3/8-in. mild steel plate and forming four bends. Outside bids showed that each stake would cost approximately \$5. This figure indicated there was room for considerable savings on this item.

An investigation by the railroad showed that a savings of over a dollar a unit could be effected by installing in its own shop a press brake of sufficient capacity for multiple punching and forming these car side stakes.

A 400 series, 12-ft. Cincinnati all



THIS is another heavy duty railroad job economically handled on a press brake—the bending of the end of a hopper car chute. The machine is a No. 340 series, 12 ft. Cincinnati press brake capable of forming a right angle bend in 5/8 in. steel plate 12 ft. long. According to the records, this machine has refunded the investment four times during three years of service.

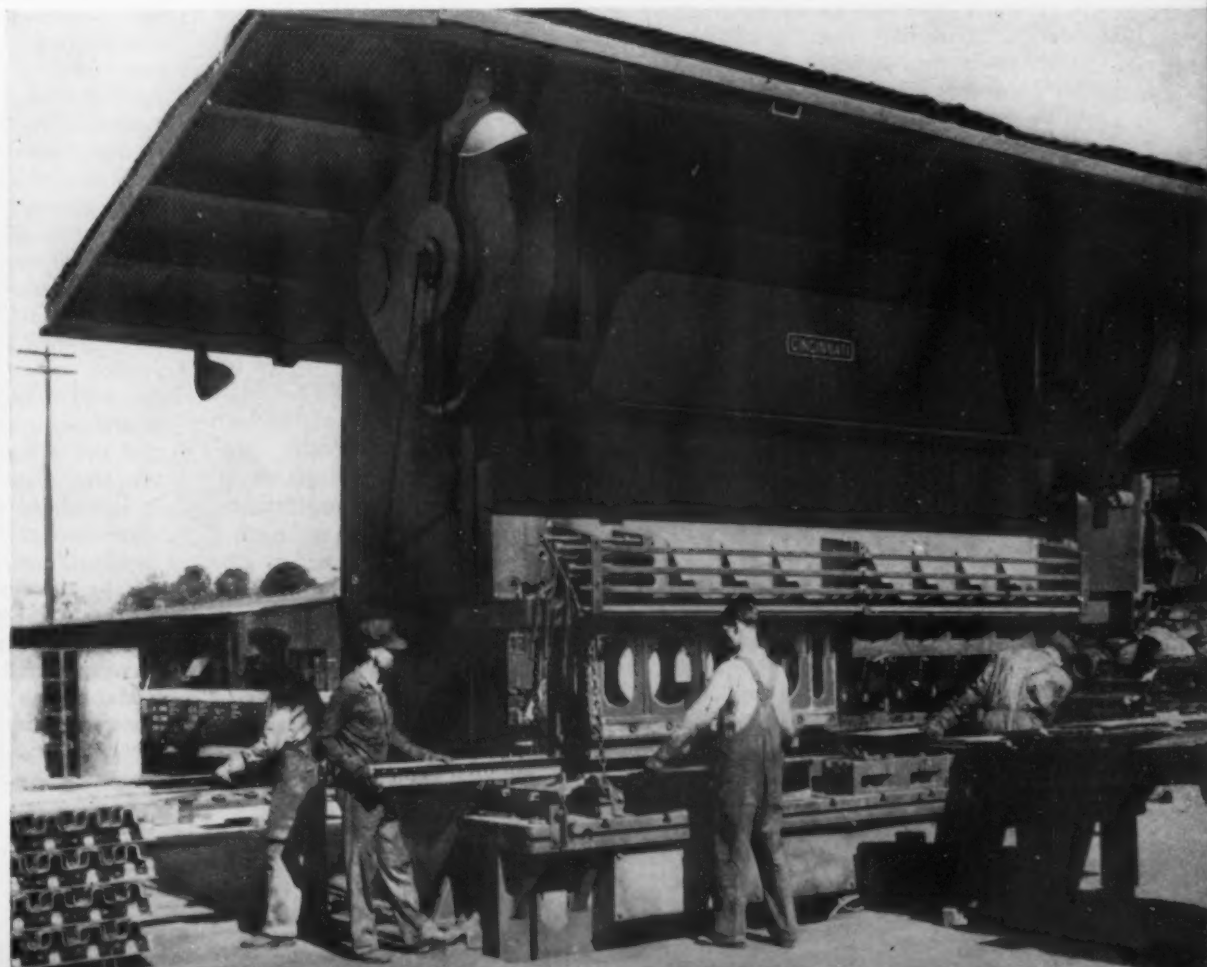
steel press brake was selected and built to specifications to handle this as well as other heavy duty railroad punching and forming jobs. The 18,000 car side stakes were produced the first two months the press brake was in opera-

tion. This gave a savings of \$1 a stake, or a total of \$18,000, and proved the press brake would pay for itself completely on this job alone in less than four months, by the economies it effected.

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MULTIPLE punching and forming car side stakes of 3/8 in. mild steel in a 400 series, 12-ft. Cincinnati press brake. From right to left; the first man feeds the punching station where forty-five 11/16 in. diameter holes are put into the blank. Punched piece goes to second man for forming; third man removes punched and formed car side stake from press brake; fourth man stacks the completed units. One stake is produced at each hit.

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ELECTRIC

Development and application

THE earliest attempts to melt iron by means of an electric current appears to have been made by Wilhelm von Siemens about 1879. The experiments were on a laboratory scale, and his apparatus consisted of a crucible and two carbon electrodes. In his earlier experiments he utilized the heat radiated from an arc formed above the charge, while later he made use of the principle which now underlies the more modern design of arc furnaces—that is, the arc was formed between one electrode suspended above the charge and the charge itself, which was in contact with a second electrode situated at the bottom of the crucible. Although his apparatus was very crude, Siemens succeeded in melting 22 lb. of iron in an hour and demonstrated the possible applications of the electric arc furnace.

The commercial development of the electric furnace, however, depended on the supply of cheap power. It is, therefore, only natural that the most rapid development took place in those countries where water power could be used to generate cheap electrical energy. The first commercial furnaces made their appearance in about 1899 and they all obtained their power from water-driven plants. The chief names associated with electric furnaces at that period were Stassano in Italy, Heroult in Savoy and Kjellin in Sweden, and the furnaces which they introduced were the prototypes of the furnaces in operation today.

The Stassano furnace, which made its appearance in Italy about 1898, was of the direct arc type and was originally designed for the direct production of steel from iron ore. It took the form of an ordinary charcoal blast furnace in which the tuyeres were replaced by carbon electrodes. That furnace was not a commercial success, and was replaced by the Stassano rotary arc furnace. In this latter unit the whole of the heat was produced by an arc formed above the metal bath, between two carbon electrodes which enter the furnace through the side walls. The heat from this arc was transferred to the bath by radiation and by reflection from the

curved roof. The current was conveyed to the electrodes by flexible cables, which were situated under the furnace so as to permit the furnace to be slowly rotated. The object of rotating the bath was to keep the molten metal in motion, thereby facilitating the chemical reactions and ensuring complete mixing of the steel produced.

In 1890 Paul Heroult, who had by that time greatly improved the methods employed in the production of aluminum, turned his attention to electric furnaces for the melting of iron and steel. In the Heroult furnace the heat was generated by means of radiation and resistance. The furnace itself consisted of a cylindrical steel shell, lined with suitable refractories, and a dome-shaped removable roof. Two carbon electrodes entered the furnace through water-cooled glands in the roof. The electrodes were so designed that they could be raised or lowered as required according to the state of the charge, either by hand or electrical control. The current passed down one electrode, through the bath to the other electrode. Thus, the heat was generated by the arcs formed between the two electrodes and the bath, and also by the resistance of the bath to the passage of the current.

The next important development appears to have been the Girod furnace. In this unit, the positive pole of a current circuit was connected to one or more carbon electrodes which entered the furnace through the roof, while the negative pole was connected to steel electrodes, the upper ends of which passed through the bottom of the furnace and were in actual contact with the metallic bath. The number of carbon electrodes above the

bath varied according to the capacity of the furnace, but whatever their number they were all mounted in parallel and connected to the same terminal of the circuit, the other terminal being connected to the steel electrodes. Since this furnace produced heat by the arcs between the upper electrodes and the bath and by the resistance of the metallic charge to the passage of a current, a greater efficiency for melting cold charges was claimed. The furnace worked at a very low voltage, about 50, and was mounted on a pivot or cradle.

Another interesting development was the Nathusius furnace, in which the combined arc-resistance design was carried a stage further. In this unit, three vertical carbon electrodes passing through the roof were arranged at the apices of an equilateral triangle and connected to the outer ends of a secondary circuit of a three-phase generator or transformer, while three steel electrodes built into the bottom of the furnace, also in triangular formation, were connected to the inner ends of the secondary circuit of the same generator or transformer. The three inner ends of this secondary circuit of the generator or transformer were kept separate, so that the neutral point of the machine was transferred into the charge itself. It is claimed that this furnace gave more perfect heat distribution, since the heat was generated by the arcs and by the resistance of the metallic charge to the passage of the current, which formed arcs or paths of current between each of the three upper electrodes, each of the three lower electrodes and between each upper and lower electrode. Furthermore, this flow of current caused the bath of

FURNACES

for the melting of metals

By G. R. BASHFORTH

molten metal to rotate in a regular manner, facilitating chemical reactions and thorough mixing of the charge.

It is from these early designs that the modern arc and arc resistance furnaces were evolved. Contemporary with this development has been the evolution of the induction furnace.

Induction Furnace in 1887

In 1887, Ferranti demonstrated that iron and steel could be melted by its resistance to the passage of electric currents induced within it. The Ferranti induction furnace might be regarded as an electric transformer in which the primary coil induces a current in an annular chamber or bath of metal which replaces the secondary winding. The same principle was adopted by Colby in the United States in 1890, although his furnace differed slightly in its arrangement from Ferranti's design.

Probably the best known of the early induction furnaces was the Kjellin unit, which appeared about 1900. With the aid of this furnace, Dr. Kjellin succeeded in producing steel from a charge of ore briquettes, pig iron and steel scrap as early as 1900, and as a result of further experiments and improvements he was producing high grade tool steels commercially in 1902. In the Kjellin furnace the metal lies in a circular trough, the ring of metal forming a closed iron circuit, through which a secondary current or currents are induced by means of a primary high voltage current passing through specially wound coils. The primary was level with the bath of steel and was wound round one leg of the transformer, which was built up of laminated plates. This type of furnace,

however, merely provides a melting medium and does not allow any refining. The necessity of having a bath large enough for slag refining led to the introduction of the Rochling-Rodenhauser furnace, in which both legs of the transformer were provided with secondary windings, which were surrounded by annular induction chan-

THE history and development and present construction of the various types of electric furnaces are described in detail by the author herein. Additional data cover the operation of different furnaces for various products today, approximate costs, and what alterations in construction and technique may be expected in the near future. This paper is a reproduction of the presidential address, Oct. 24, before the Staffordshire (British) Iron and Steel Institute.

nels. These induction channels are connected by or with a central channel. The presence of a rotary field causes the bath to rotate automatically. The size of the central channel which forms the main working hearth necessitates additional heat supply, therefore a secondary winding connected to pole plates are embedded in the sides of the hearth. When using a three-phase current, this furnace has three side channels surrounding three primary coils. These side channels are

connected to a central channel, which is heated by means of a secondary winding, the terminals of which, consisting of cast steel plates, are embedded in the lining of the hearth and side channels. At the high temperature of the furnace the dolomite lining becomes conductive, so that a secondary current is induced in this secondary winding and flows through the central hearth of the furnace.

The Frick was another well-known early induction furnace, and was similar in design to the Kjellin furnace. A 10-ton Frick furnace was successfully operated with a power consumption of 620 kw-hr. per ton of steel produced. This furnace had an annular bath with an outside diameter of 9 ft. and an inside diameter of 6 ft. 4 in. Of the 10 tons of materials charged, 6 to 7 tons of the finished product was tapped off and the remainder, approximately 4000 to 5000 lb., after allowing for depreciation, was left in the furnace to form the secondary circuit for the next heat. The primary current was 5000 volts, with a frequency of five cycles per sec., the power being equal to about 265 amp. The power factor of this furnace was only 0.528.

Some idea of the growth of electric furnaces as applied to the iron and steel industry is indicated by the following statistics:

In 1906 the first electric furnace, Heroult in type, was installed in America, and by 1914 this figure had increased to 19, by January, 1915, it was 41, increasing to 136 in 1917. On Jan. 3, 1918, THE IRON AGE published a return which showed 733 electric furnaces as being in production, of which 131 were operated in Great Britain. Since 1918 a very rapid extension in the employment of electric furnaces has taken place, but the author has been unable to obtain what

he considers sufficiently reliable statistics to merit their publication.

Arc furnaces can be divided into two types, the indirect arc or arc radiation furnaces, and the direct arc or arc-resistance type. In the arc radiation or indirect type, the heat is generated by an arc formed between two electrodes formed above the charge, and this heat is transferred to the charge by radiation and by reflection from the furnace lining, as in the case of the Stassano furnace. It is obvious that the life of the linings of such furnaces is of a low order. The bath is usually rotatable, so that the continuous rocking motion causes the charges to be more uniformly exposed to the radiant heat. This rotation of the bath also prolongs the life of the linings. This type of furnace is chiefly employed for melting alloys which do not require a very high temperature. Many furnaces of this type are in use in foundries, and their adoption has resulted in considerable economies and the production of a more uniform product. It is sometimes employed in the iron foundry for the production of ordinary grades of cast iron. Its use permits the use of cheap scrap, even borings and turnings, thus offering an economic process for even low duty castings. In some foundries, it is customary to charge all cold materials and to tap off the whole heat when ready. In other cases a semi-continuous process is employed, part of the charge being left in the furnace after taking off the required amount for immediate work. This feature is particularly useful in foundries manufacturing a wide range of specifications, as several grades can be produced by suitable alloy or scrap additions to one metal base. This type of electric furnace is particularly useful in work producing both ferrous and non-ferrous castings, as a spare body, which can be quickly changed, may be kept at hand, and one body may be used for ferrous and the other for non-ferrous work.

The use of the electric furnace does ensure a more uniform product and also more uniform working in the foundry and adjacent shops. A cold furnace may be started up from cold materials and have a charge ready for tapping within 2 to 3 hr., and has the added advantage of giving supplies of metal at regular intervals, which facilitates work in the foundry generally. It is claimed that the only electric furnace to obtain widespread application in the brass foundry is the Detroit rocking arc furnace.

Probably the most important type of electric furnaces are the direct arc, or the arc resistance type, which have been developed chiefly from the Heroult furnace. In this type of furnace the heat is produced by arcs between the electrodes and the bath, and also by resistance of the metallic charge to the passage of the current. Most of the modern direct arc furnaces are a development of the Heroult type, usually employing a three-phase a.c. current and having three electrodes which enter the furnace through the roof. The electrodes can be raised or lowered as required, either by hand gearing or electrical means. In many furnaces the electrodes are automatically controlled. In the majority of cases the current is actually supplied by a step-down transformer from high-tension mains.

The transformer is designed so as to allow various voltages to be supplied to the furnace, as the usual practice is to melt at a high voltage and to refine at a lower voltage. The capacity of electric furnaces varies considerably. In America, furnaces of 80 ton capacity are in operation, but the more popular size seems to be 25 to 30 tons. Table I shows the progress of electric furnace production between 1929 and 1937 as far as America is concerned.

TABLE I		
Steel Ingot Production in the United States.		
	1929	1937
Basic open		
hearth	46,644,206	45,719,507
Acid open		
hearth	576,393	333,473
Bessemer	7,091,680	3,449,927
Electric	532,392	814,310
Crucible	5,762	934
TOTAL	54,850,433	50,318,151

The figures in Table I certainly suggest that the electric furnace is not only replacing the crucible process, but is also displacing acid steels for many purposes. In a recent report on American electric steel production, issued by Arthur G. McKee & Co., Cleveland, it is pointed out that although electric furnace operation is largely confined to the manufacture of S.A.E. and tool steels, and of the stainless grades, it is also used under some special circumstances for the production of common carbon steels. A. G. Robiette, of the Birmingham Electric Furnace Co., Ltd., described in the January, 1938, issue of *Iron and Steel* (British) the production of common quality basic billets in a 10-

ton Lectromelt furnace in Canada. In this particular instance, scrap is melted with ore and limestone additions, giving a black oxidizing slag. The whole charge of 10 tons is melted in 45 to 60 min., when a sample is taken from the bath, so that the necessary carbon and alloy additions may be made. In some works these additions are made in the ladle, although some manufacturers prefer to make bath adjustments.

The heat is then tapped off into a ladle and teemed into small ingot molds varying from 3-in. square to 6-in. square in section. The ingot molds are not provided with hot tops, and although bottom pouring has been tried it has been abandoned, owing to the excessive scrap due to gates and runners. The total time taken for a 10-ton heat is approximately 1½ to 1¾ hr., and the power consumption is quoted as 520 kw-hr. per English ton produced. Since the time between heats, that is from "power off" for tapping to "power on" after recharging the furnace, is only 10 min., it is possible to produce 140 tons of billets per day from one 10-ton furnace.

Production statistics are as follows:

Size of heat = 10.5 tons.
Time per heat = 1 hr. 35 min. to 1 hr. 45 min.
Output per day = 140 tons.
Hours per week = 120.
Crop loss = 5 per cent.
Melting loss = 5 per cent.
Percentage yield = 90 per cent.
Total conversion cost per ton of billets = £2 4s. 10d.

The direct melting costs per ton of steel in the ladle = £1 13s. 10d.

It is pointed out that these results have been obtained by the use of a multi-voltage transformer, which enables the maximum power input during melting, but as pools of metal begin to appear the voltage is reduced to prevent excessive radiation to the side walls and roof. The rapid charging of these furnaces is accomplished by a removable roof. According to an article in *Steel* in 1936, the top-charging type of electric furnace was first patented in 1925, but was not developed until 1932, since when it has been used to a considerable extent.

Top Charging Reduces Costs

In some cases, as in the Lectromelt furnace, the roof swings round so as to allow the whole charge to be put into the furnace by means of a drop bottom bucket. In other cases, the roof slides to one side, allowing a similar method of charging. Towards the end of its useful life, a roof tends

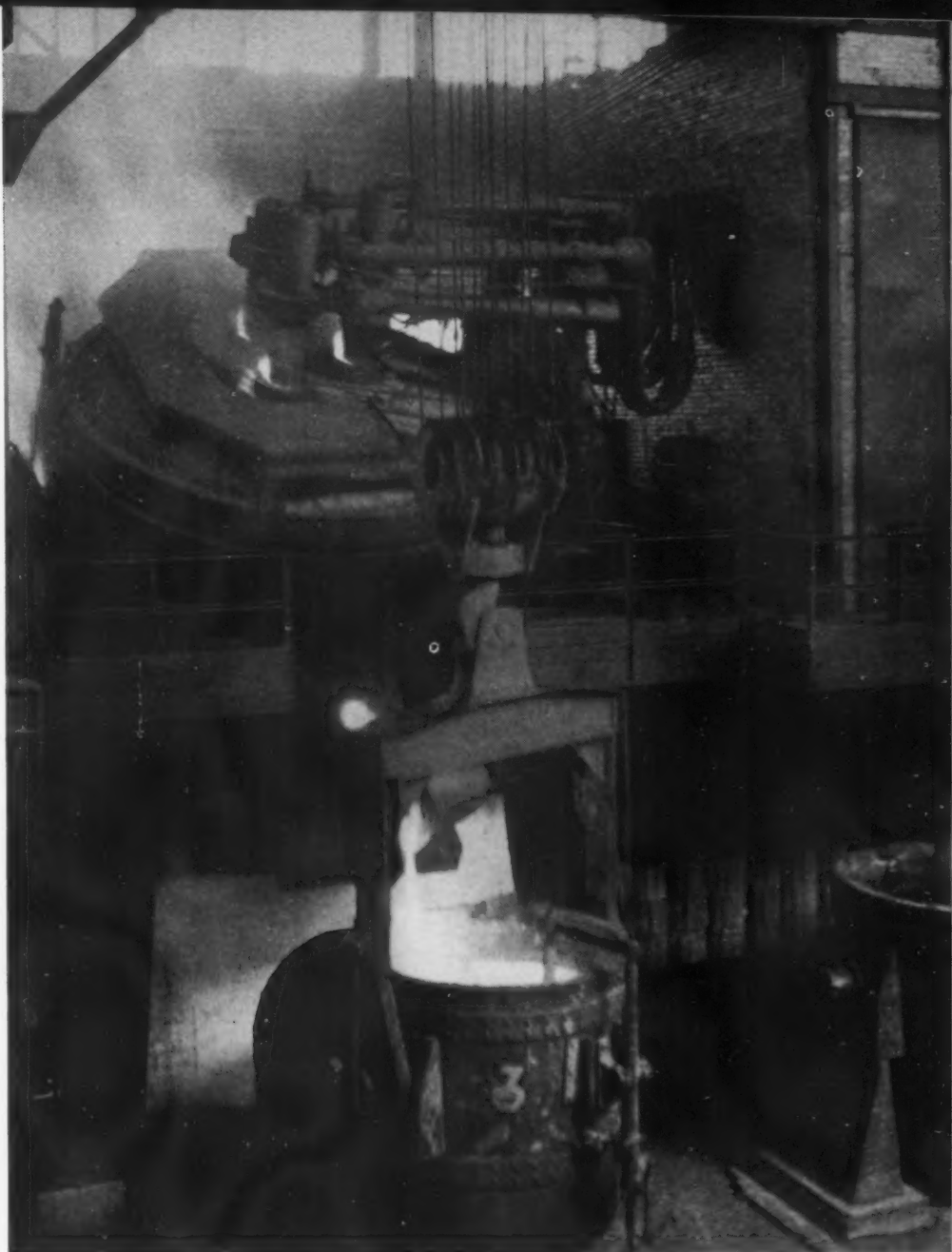
to become weak and some danger may accompany its being removed for top charging. This disadvantage has been overcome in the Siemens-Halske furnace by having a fixed roof, but a hearth designed so as to slide away from the roof.

These methods of top charging have considerably reduced the charging time of electric furnaces. With a removable roof or sliding hearth it is possible to charge a 10-ton to 20-ton furnace in 5 to 15 min. It is claimed that by direct comparison in two 25-ton furnaces in America this reduction in the charging time has resulted in an average increased production of 30 per cent, while the refractory costs decreased 22 per cent, electrode consumption 15 per cent, and the power consumption was reduced from 670 to 625 kw-hr. per ton.

The power consumption varies considerably with the size of the furnace and with the particular practice employed. For melting cold scrap charges in small furnaces the power consumption is approximately 600 kw-hr. per ton, falling to 450 kw-hr. per ton in some of the larger furnaces. To this figure must be added the power consumed during refining, which naturally depends on the length of the refining period. For the refining of cast steel with one slag, the additional power may be 150 to 180 kw-hr. per ton, while for the production of special transformer sheet steel with very low watt losses an additional 300 to 400 kw-hr. per ton will be required.

Another important feature of electric furnace operation is the control of the electrodes. In the early days of electric furnaces, the electrodes were raised and lowered as required by hand. But, sometimes the electrodes were forced down against obstructions, thus causing excessive breakage. For that reason, most modern furnaces are fitted with devices for automatically controlling the electrodes.

In a review of electric steel furnace practice in the United States, which appeared in *Metal Treatment* (British), spring, 1939, it was shown that electric furnaces are not only being used for high-class steel production, but also in the steel and iron foundry, and in the production of common grades of steel. Sometimes these furnaces are worked on a duplex process in conjunction with the cupolas in the case of iron, and with Bessemer converters in the case of steel. When making common grades of steel it is usual to employ ingots varying from 2¼ to 6 in. square and about 3 ft. long. Sometimes these



OWING to the convenience and the control possible, the electric furnace will be increasingly employed in both ferrous and non-ferrous practice. Another field likely to develop is the use of electric furnaces in conjunction with Bessemer converters for the production of high grade steel. Also, the replacement of the crucible process and challenging of the acid open hearth process by the electric furnace will both likely continue. Photo shows 25-ton Heroult furnace.

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furnaces have a poor rating, owing to the fact that they are worked intermittently during the off-peak periods, thus utilizing cheaper current.

The demand for larger furnaces has led to some radical changes in electric furnace design. In America, steel produced in large electric furnaces does not obtain the same price as the same class of steel produced in smaller furnaces, because of apparent differences in properties. This may be due to the fact that chemical reactions between the metal and the slag only take place in a comparatively

small zone around the arcs. In small furnaces this disadvantage is not very pronounced, as the arcs cover a wide area of the bath. In larger units, however, in order to obtain a more intimate reaction between metal and slag over the whole surface of the bath, overheating in the locality of the arcs is likely to occur. This limitation has been largely overcome, however, by rotating the hearth. Siemens-Schuckert have recently installed in Great Britain a 10-ton furnace with a rotating hearth which will shortly be in operation. In the rotary arc fur-

nace, as soon as a sump of metal forms under the electrodes, the electrodes are raised and the furnace is rotated a few degrees, bringing another portion of unmelted charge into direct contact with the arcs. During the refining process, the bath of molten metal is slowly rotated backward and forward by automatic gearing, thus giving a more uniform transfer of heat over the whole surface of the hearth and facilitating chemical reaction between metal and slag. This furnace is also provided with a sliding roof, facilitating drop-bottom bucket charging.

In the majority of cases, the English practice is to run two refining slags. When the carbon and phosphorus have been removed to the desired limits by an oxidizing slag, this is removed and a new reducing slag is formed by the addition of lime, spar and anthracite, and in some cases, alloy additions.

Reference has been made to electrode consumption, which is of considerable importance. The main consumption of electrodes does not generally take place at the arcing end of the electrode, but over the surface of the electrode within the melting chamber and up to a point some 12 to 15 in. above the roof. This erosion of the electrodes is due to the oxidizing flames or fumes ascending and passing through the space between the electrode and the electrode opening in the roof. It is not unusual to find electrodes badly tapered at this point. Many devices for preventing this erosion have been suggested, the most successful being those types which aim at preventing the escape of hot gases at this point, a notable type being the Stobie economizer.

Probably the most interesting development during recent years has been the introduction of the high frequency induction furnace. This type of furnace has been evolved from the low-frequency induction furnace already described, and their introduction was due to certain electrical and metallurgical disadvantages connected with the low-frequency type. Since the distance between the primary coil and the annular bath of metal forming the secondary circuit was always comparatively large, a large area existed in which stray magnetic fields were induced and in which much leakage took place. This resulted in a low power factor. Again, this type of furnace was merely a melting medium, there being little or no room for slag refining, even if a sufficiently fluid slag could be maintained.

In spite of these disadvantages, the

low-frequency induction furnace is still employed at some plants for the production of special steels. An installation employed in the reclaiming of stainless scrap is referred to by Bosworth and Johnson in their paper on American electric furnace practice before the American Iron and Steel Institute in 1938. This furnace is rated at 6 tons capacity and is of the horizontal ring type, having a crucible 7 in. wide at the bottom and 15 in. wide at the top, and 15 in. deep. The primary coil is supplied with current from a single-phase generator at 2,200 volts at 8.57 cycles per sec. The furnace is worked in conjunction with an electric arc furnace.

Some idea of the economies of the induction furnace as applied to the production of brass billets can be obtained from the following figures supplied by the Electric Furnace Co., Ltd. For the production of one ton of 60:40 brass by the electric furnace, the cost is 19s. 2d., whereas by means of the crucible process the cost is 34s. The power factor of these furnaces is 80 to 85 per cent, according to the frequency. The capacity of the furnaces vary. They are manufactured in three sizes—600 lb., 1200 lb., and 2240 lb. capacity, absorbing 60 kw., 120 kw., and 240 kw., respectively. The actual lining of the working crucible depends on the process in use. If the material to be melted is a conductor of electricity, the crucible is made of a non-conducting material, such as silica or magnesite. If the material to be melted is a non-conductor, then the crucible is made of graphite or a conducting material.

High Frequency Operation

When, for metallurgical and other reasons, it was decided to dispense with the iron core of the early induction furnaces, it was found necessary to increase the frequency of the current in the primary circuit, in order to induce a secondary current of sufficient magnitude to melt a body of metal. In the earlier high-frequency furnace this high-frequency current was supplied by static converters of the Tesla spark-gap type. In recent years, however, motor generator sets have been designed to supply frequencies between 500 and 2500 cycles.

The high-frequency furnace consists essentially of a body or box containing a primary coil, which is usually composed of water-cooled copper tubing. Although this coil is situated very near to the metal, it is maintained at a very low temperature. Inside this

coil is the crucible, the space between the crucible and the coil being packed with sand or suitable insulating material. The crucible sometimes takes the form of a formed crucible, but the modern method is to form the crucible by ramming suitable refractory material around the outside of a metal former or template. This rammed material is then heated by a current induced in the metal former until the refractory lining has fitted. The former or template may then be withdrawn or may be melted in the first charge.

Although the early high-frequency furnaces offered an ideal medium for melting metals without fear of contamination of the charge by carbon, sulphur or other deleterious elements, they also presented some disadvantages. The removal of the iron core which formed an important feature of the low-frequency induction furnace, resulted in the reduction of the conductivity of the magnetic flux to the conductivity of air, with a corresponding reduction of flux. It also resulted in the magnetic field being uncontrolled in its distribution, which not only limited the efficiency of the furnace, but also made it imperative to avoid magnetic material in the construction of the furnace. This is the reason for some of the earlier high-frequency furnaces being encased in a wooden box. At a later date, when a structural steel casing was used for the coreless type induction furnace, a magnetic shield of sheet copper was introduced to prevent overheating of the furnace casing by stray magnetic fields. The suitable screening of high-frequency furnaces has occupied the attention of many technologists and has been the subject of several interesting papers.

An interesting development in this sphere was the introduction of the Witton high-frequency furnace, which might be regarded as a semi-coreless furnace. In this furnace an alloy steel path surrounds the inductor coil, and this steel path passes underneath the crucible, terminating in the nucleus of a core in a central position under the crucible and in line with the vertical axis of the inductor coil. This design results in a strong and centrally situated magnetic field within the crucible containing the charge, with corresponding reduction in the tendency for stray magnetic fields and obvious and valuable economies.

Some difficulty was experienced in

refining steel in the early high-frequency furnaces. This was mainly due to the erosion of the furnace crucible, as the induced current causes the level of the metal to rise in the center in the form of a fountain. This turbulence was at one time considered necessary to successful refining, but Victor Stobie points out that this is not so. The difficulty connected with this excessive corrosion of the crucible around the slag line is, to a great extent, overcome in the Stobie high-frequency furnace. In this unit the walls of the crucible are carried above the height of the inductor coil, and are made considerably thicker at the slag line. On the slag line the walls of the crucible are also sloped similar to the arc or open-hearth furnace.

The frequency and voltages employed vary considerably, but as a rule the frequency lies between 1000 and 2500 cycles, the higher value being used for small furnaces, that is, those under 1-ton capacity. The voltage in the furnace coil is generally between 1000 and 2000 volts.

An interesting development of the induction furnace is the dual frequency furnace in which economic melting is attained by use of a high-frequency current, while a low-frequency current is employed for refining. The final heat control is usually made by use of a high-frequency current. The use of the high-frequency furnace for the production of high-grade steels has extended very rapidly during recent years in many parts of the world. They are working on hot and cold charges, and a very profitable avenue appears to be duplexing in conjunction with the open hearth or Bessemer process. This type of

furnace is also employed in the production of certain non-ferrous alloys.

Reduction Furnaces

So far, no reference has been made to electric reduction furnaces, of which there are several different types. J. Bibby in 1919 described a very successful furnace employed in the reduction of iron ore. This furnace is similar in design to an ordinary blast furnace, with the exception that the hearth is three or four times the diameter of the shaft. This hearth, which constitutes a melting and crude refining chamber, is heated by electrodes passing through the roof of the chamber. Whereas in the ordinary blast furnace the heat required for the process is produced by the combustion of coke, in the electric blast furnace the whole of the heat necessary is produced electrically and coke is merely used as a reducing agent. This results in a 60 per cent reduction in the coke consumption and a corresponding reduction in the quantity of impurities passing into the pig-iron produced. The iron ore, coke and lime are charged at the top of the furnace in the usual way. The reduced iron, together with the lime and gangue gravitates down to the crucible or hearth, where crude refining takes place.

Since the whole of the gas produced results from the oxygen in the ore and the carbon in the coke, there is only about 14 per cent of the volume of an ordinary blast furnace, but the calorific value of the gas is considerably higher. There is no external air supply as in the blast furnace. About 60 per cent of the gas issuing at the top of the shaft is reintroduced into the furnace hearth between the charge and the roof. The object of this cir-

culatation is to cool the roof of the hearth and to convey the heat into the shaft. A type of furnace extensively used in Norway, Sweden, Finland and Italy produces 22,000 cu. ft. of gas per ton of pig iron produced. The dry gas has a calorific value of 275 B.t.u. per cu. ft. The voltage employed is 100 volts, the power consumption being between 2100 and 2750 kw. per ton. The electrode consumption varies from 16 to 30 lb. per ton. Low-grade coke or anthracite is used as a reducing agent.

The future growth of the electric furnace is very largely dependent on the cost of power production. In districts where cheap power can be obtained, or where cheap power can be generated from low pressure steam or surplus coke oven or blast furnace gas, the electric furnace has an assured future. Owing to convenience and the control possible, the electric furnace will be increasingly employed in both ferrous and non-ferrous foundries. The tremendous extension in the use of the electric furnace in foundry practice during recent years is definite verification of this statement. Another field in which the use of the electric furnace is likely to develop is in conjunction with Bessemer converters for the production of high-grade steel. The replacement of the crucible process by the induction furnace will undoubtedly continue and it may be that the acid open hearth process will be seriously challenged by the electric furnace. When assessing the economies of the electric furnace, the quality of the product must not be overlooked—this quality of the product may frequently lead to considerable saving in the subsequent treatment and dressing of the product, and this saving must be set against the first cost of the process.

Plating Rack Coating Applied by Dipping

A NEW material for coating plating racks which is applied by dipping and force drying at a temperature of about 200 deg. F. has been developed by United Chromium, Inc., 51 East 42nd Street, New York. Identified as Unichrome Rack Coating-W, this material is said not to be affected by boiling cleaners or by plating solutions in general use, including chro-

mium, and contains no ingredients which are in any way harmful to a plating bath.

Unichrome does not blister, it is claimed, and is tough enough to withstand the wear and treatment of normal handling. It is white in color, making it possible to readily observe any uncovered portion of the rack.

Should a portion of the rack be laid bare, or should structural changes be made to the rack, the uncovered portion can be protected without the necessity of recoating the entire rack.

In a number of typical applications, the cost of this coating material has been slightly less than 1 cent per day per rack.

FINNED TUBING

BY WELDING

By DON JAMES

Cleveland Editor, *THE IRON AGE*

THE use of extended surfaces or fins on tubing has long been a tool of the heat exchange engineer. Such fins, for the most part, have been the helical or radial types and the processes for their manufacture have been developed to a high degree of economy and speed.

Finned tubing having longitudinal fins also has great utility in the field of heat transfer, especially where the flow of gases or liquids must be lengthwise of the tube. However, the production of such finned tubing has had little attention from manufacturers. To serve those who require this type of heat exchange surface, the Brown Fintube Co., Elyria, Ohio, has developed a fast production method for ap-

plying fins longitudinally to tubing, the bond between fin and tube being made by means of resistance welding.

The problems involved in the fabrication of such a product, of course, were inseparably connected with those of welding and specifically the welding of relatively light fins onto heavy pressure tubing without distortion of the tube and with the fins correctly spaced about the periphery of the tube. There was also the problem of creating special equipment to do such work almost automatically and by means of control mechanisms that function under electrical impulses lasting less than a sixtieth of a second.

The Brown "fintube" resulting from these investigations consists of pres-

sure tubing upon which is welded channels formed from narrow cold rolled strip steel. The legs of the channel become the fins in the finished product. The limits of the process as to diameter of tubing, length of tubing and depth of fin are extremely wide. The equipment now operating in the company's Elyria plant will apply fins varying from $\frac{1}{4}$ in. to 3 in. in depth to tubing ranging from $\frac{5}{8}$ in. to 4 in. in outside diameter. The length of finned tubing is limited only by the lengths of tubing available on the market.

The cold rolled strip is 18 to 25 gage. The tubing is usually seamless drawn, 6 to 16 gage, although several users have approved of the use of

EXAMPLES of structural uses of finned tubing, made by welding cold rolled strip fins to drawn or welded tubing.



Structural members



Airstream heating



Wing structure



Wall board partitions



Other shape



Clip for glass

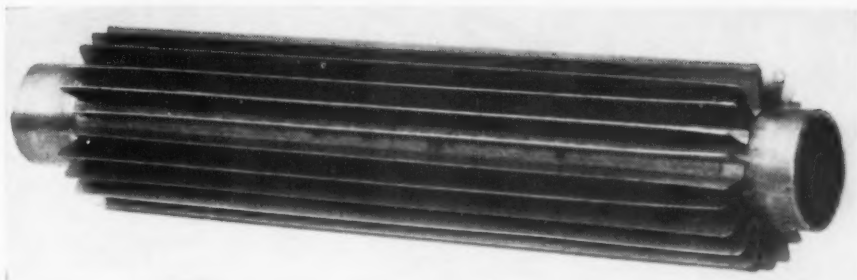


Other shapes

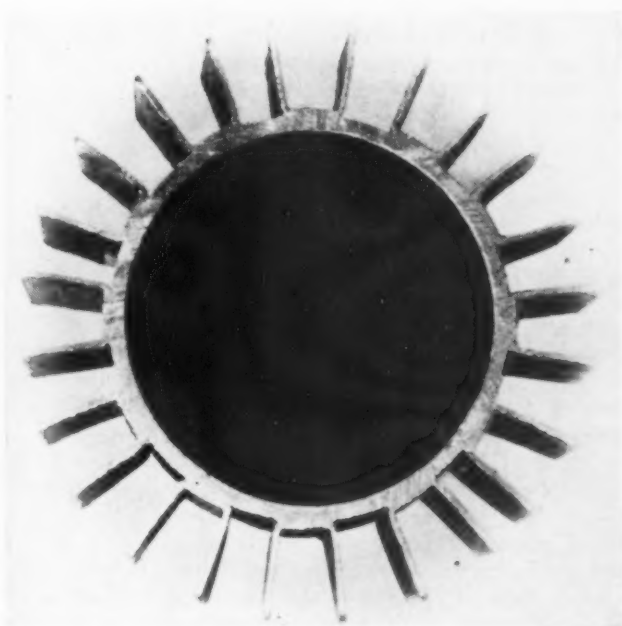


Other shapes





ABOVE
A SHORT length
of tubing with
longitudinal fins
welded to it.



AT LEFT
CLOSEUP view of
end section of a
tube, showing the fin
welds.

welded tubing. For both fin and tube, 18-8 stainless may be used satisfactorily provided annealing is carried out afterward.

Of considerable importance is the fact that the product has mechanical and structural applications, in which case carbon steel welded tubing is employed. Bench legs, partition supports

for glass and plywood, frames for low cost buildings, airplane stress members and bus bodies are among these applications already developed. For certain applications, also, flat extended surfaces are welded onto the tube.

On its finned tubing, to effect the utmost in manufacturing economies through standardization, the company

inquired into the requirements of the heat exchanger industry as to the possible combinations of fin and tube having the widest application. Based upon this study, four standard sizes of longitudinally finned tubing have been made in quantity, as follows:

1-in. O.D. tubing, 13 gage, with 12 $\frac{1}{2}$ -in. fins, 20 gage.

1-in. O.D. tubing, 13 gage, with 12 $\frac{3}{4}$ -in. fins, 20 gage.

2-in. O.D. tubing, 12 gage, with 24 $\frac{1}{2}$ -in. fins, 20 gage.

2-in. O.D. tubing, 12 gage, with 24 $\frac{3}{4}$ -in. fins, 20 gage.

The standard sizes given above afford a total of 1.25 sq. ft., 1.75 sq. ft., 2.5 sq. ft. and 3.5 sq. ft. respectively of surface per lineal foot of tubing. Since 1-in. tubing, bare, has 0.25 sq. ft. of surface per lineal foot and 2-in. tubing has 0.5 sq. ft. of surface per lineal foot, the ratios of prime to secondary surface for the above given sizes are approximately one to five for the $\frac{1}{2}$ -in. fin and one to seven for the $\frac{3}{4}$ -in. fin.

At the present time the Brown Fin-tube Co. is offering its "fintubing" in 0.10 carbon steel and 18-8 stainless steel. The latter alloy is used in applications requiring chemical stability and corrosion resistance.

The longitudinally finned tube has an integrally welded bond for the full length of the fin contact with the tube, the permanence and heat conduction of which is admittedly superior to any of the many mechanical methods of applying fins to tubes.

The tubing has prospective use in any industry in which the problems of heat exchange are important to its processes. Such industries as the oil refining and chemical industries are excellent illustrations.

9-12 Months' Life Claimed For New Rust Preventative

A NEW rust preventative and protective coating for steel, brass and other metals, which it is claimed will protect the surface for a period of 9 to 12 months either in storage or shipment, has been developed by Estox Products Co., 151-1 Brewery Street, New Haven, Conn.

This product, known as Metaseal 494, is the result of 10 years of experi-

menting to compound a protective coating that would protect metal parts from the salt air and exposure encountered in shipping abroad. Metaseal 494 may be applied by dipping, spraying, brushing, etc., and requires no special equipment for its application. It can be removed by bathing in a thinning solution and then washing

in any standard commercial cleaning solution.

In addition to giving complete protection of clean metal parts, in either the ground, forged, machined, etc., state, it is claimed that Metaseal 494 is very inexpensive to use due to the generous area which may be covered per gallon. The coating is said to be practically invisible when applied.

Design and Construction

By C. L. SZALANCZY

Tool and Equipment Department, Westinghouse Electric & Mfg. Co.

PRODUCTION of stamped parts from metal stock has become an important factor in modern industries. At no time in the past have so many items been manufactured by punch-press-operated tools as at the present time.

This is partly because competition makes it necessary to reduce the selling price of parts and completed apparatus. In practically all lines of manufacturing, the products, both as individual parts and assemblies, are being carefully studied, and wherever possible cast items are replaced with stamped parts which can be made at considerably less cost by mass production methods.

Stamping as a general rule tends to lower manufacturing costs, while at the same time the apparatus is usually improved, the weight is reduced and breakage of fragile cast parts is eliminated.

Planning the Job

Die design and tool making have been greatly advanced by planning the tools that will be needed to produce the required parts. Tools are designed by specially trained men who have had the benefit of experience gained in the tool room while actually making the tools. The tools have been standardized, that is those parts that are used regularly in the construction of dies. Made up in quantities and carried in the tool room stock so that they may be ordered as required, standardized tools include all types of punches, die sets, guide pins and their corresponding bushings, knockers, fingers, brack-

ets and adjusting screws and locks. When the tool is being made the tool maker can draw these items from stock and a fair amount of time is saved because these items are ready to use and need not be made at the time. This procedure also helps to reduce manufacturing cost on the tools since the standardized parts are made up in large numbers at one time and will cost less per piece than if they were made up separately for each tool.

After tools are designed they are turned over to the time study department where time values on the construction are established. Unless something unforeseen occurs, the cost of the tool can be estimated to a very close degree. This is an important item especially when the tools are paid for according to the estimate. Naturally, the estimator must understand his business—he must know accurately the time required to do each machining operation, and must allow sufficient time for laying out the work and for the developments that occur in the construction of the tools.

Tools are generally made to suit the output, or in other words, before designing the tools the tool designer must know the estimated number of punchings the die is expected to produce. If only a small number of blanks are to be made, there is no need to make a heavy die such as would be required and made in great quantities of stampings were to be produced.

Thickness of the die block and the height of the punches can be consider-

ably reduced. Quite frequently the punch holding plates can be eliminated and the punches fastened directly to the lower side of the upper shoe. A less costly stripper can be made by simply machining a groove to a sliding or running fit for the blank material stock, instead of a more positive stripper that would be provided with a spring-actuated stripper bar that functions in the material groove and keeps the blank material pushed against the front of the stripper, which is always the side nearest the press operator.

This latter method of course is more costly, but has a decided advantage over the former in that when used in tool construction it will insure that the blanks will always be exactly the same from the one side, regardless of the permissible manufacturers' variations in the width of the material strip stock or variations which may occur during the shearing operation when sheet material is slit to the specified strip width.

Spring-operated bar-type strippers are used on such dies as the pierce-and-blank, pierce-and-cut-off, and pierce-and-sever. The aforementioned advantage lies in the fact that the products of these various dies are frequently used in built-up cores or assemblies where the stampings are stacked one on top of the other to the required dimension. With all the punchings being exactly the same from one side, and the length as a matter of course being always the same, the building up of the pieces in an assembling fixture is greatly simplified.

of METAL STAMPING TOOLS

Over a period of several years a careful study of all the different types of press tools has been conducted by the tool engineers of the Westinghouse Electric & Mfg. Co. Through their efforts the most suitable types of tool steels and their most efficient hardnesses were determined for each kind of a metal stamping die.

Bending, Forming, Sizing Dies

Bending, forming, and sizing dies are generally composed of two main parts: The upper or punch part, and the lower or die block. On benders the die block usually is made from hot rolled steel with backing pieces set in where the bending operations take place. In these tools a moving stripper also is employed. Backing pieces

and strippers are usually finished to size before hardening. The tool steel parts are made from various types of chrome-vanadium steel and are heat treated to 45-60 Rockwell C. In such cases where the parts must be ground to the exact size after hardening to offset distortion caused by the heat treatment process, the heat treatment should be 57-64 Rockwell C. This heat treatment applies to shallow benders and sizing dies where the entire punch and die is made from a solid piece of steel.

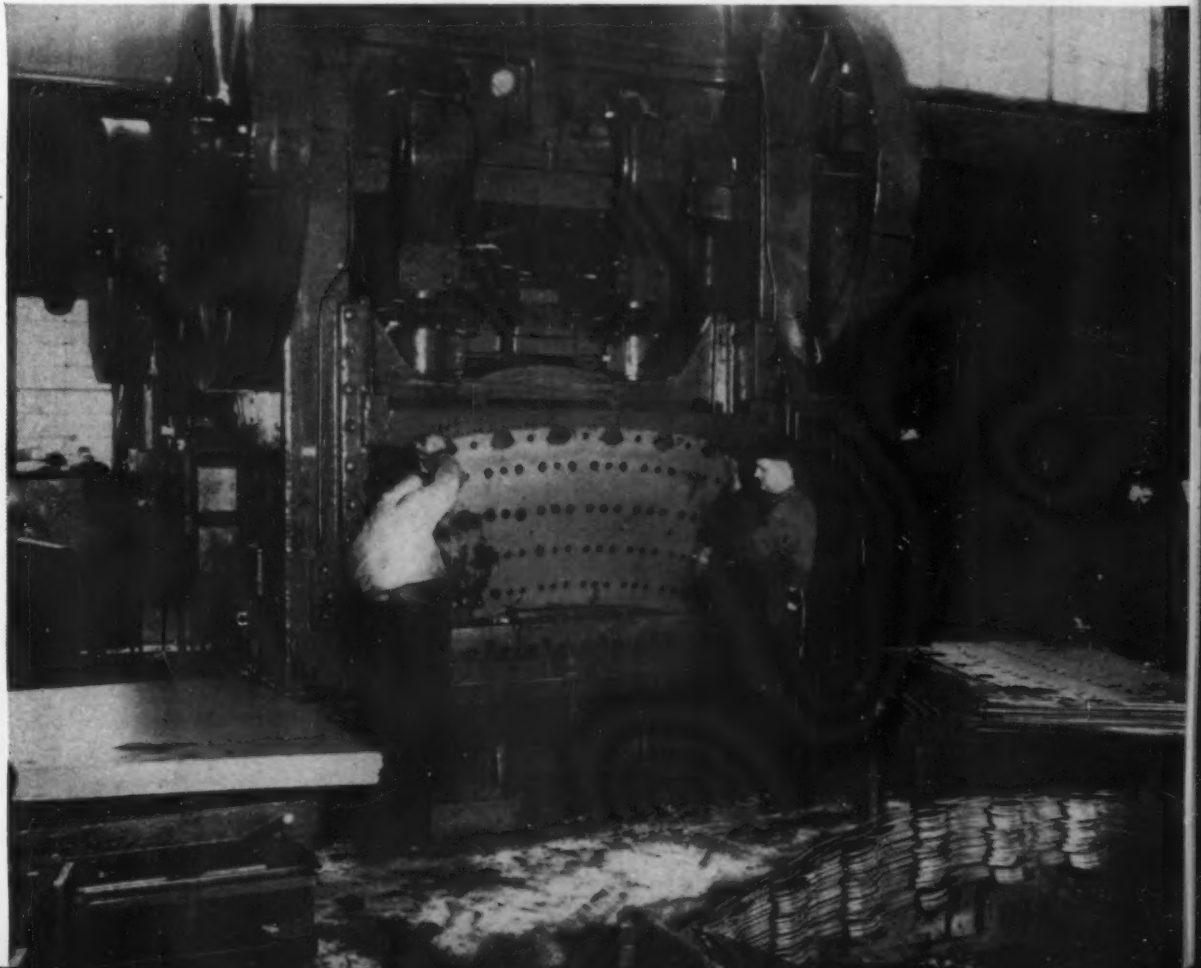
Progressive Dies

Under progressive dies come such dies as pierce-and-blank, pierce-and-cut-off, and pierce-and-sever. The last two are used only where the blank permits the use of strap material

which when parted will provide two sides of the blank.

When these dies are used, the holes are first pierced into the blank material, then the strap is moved forward against a stop that determines the length of the blank. The strap is then parted. Tests have proved that on thin material cut-off dies work efficiently, while on heavy material it is advisable to employ the severing type of tool. In either case whatever variation is on the strap material width, the same variation will appear on the blanks. The pierce and blanking dies are used when the outer periphery of the blank is of such nature that they cannot be made by the other types of dies, or when it is essential that the size of the blanks must be exactly the same. This type of tool stamps out the entire

FIG. 1 — A large type of blanking die.



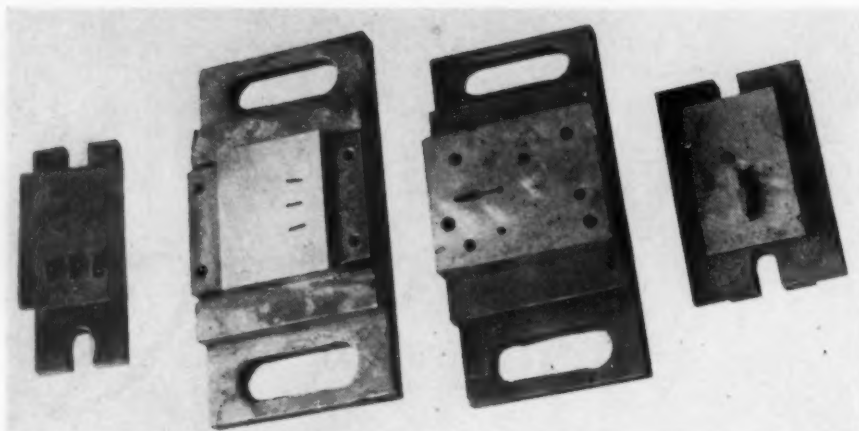


FIG. 2—Slot dies of both the single and multiple type.

blank from a strap that is somewhat wider than the blank dimension.

In all three cases the general construction is very nearly alike. The tool is set into die shoes equipped with guide pins and bushings to facilitate setting the dies in the press and to aline the two members of the die at all times during the operation.

Materials for Tools

Die blocks and blanking punches are usually made from the same grade of tool steel. The type of steel depends

upon several factors. First, the type or kind of material that is being stamped. Also the estimated life of the tool and the shape of the blank must be considered. If it is such as might distort the tool part during heat treatment, special measures must be taken to prevent it.

Most of the punches and dies in this group are made from high-speed or high-carbon high-chromium tool steels. For such parts as are to be semi-hard and the material that is being stamped is hard, the Rockwell C hardness is

from 40 to 43. For semi-hard tool parts where soft material is being stamped, the hardness is 36-40 Rockwell C.

For dies that can be ground after hardening—those used in the production of stampings from hard scale materials and which are expected to produce from 50,000 to 150,000 punchings per grind—the high-carbon high-chromium steel is heat treated to 60-63 Rockwell C. This treatment gives hardness with combined toughness, and exceptional wear resistance to the tool; also the cutting edge is of the best quality and the natural distortion is normal.

On most high-activity shaving, blanking, and various types of compound dies, and in cases where material of silicon content is punched, the die parts are made from high-speed steel. Qualities required in these die parts are hardness, minimum distortion, and the best edge for cutting purposes. On these dies the hardness depends on the type of blank that is being produced. On the general types of tool parts, 60-63 Rockwell C is considered best. When fragile punchings or blanks that have small impressions or extensions on their periphery are to be stamped the tools have to be made to suit these conditions. This

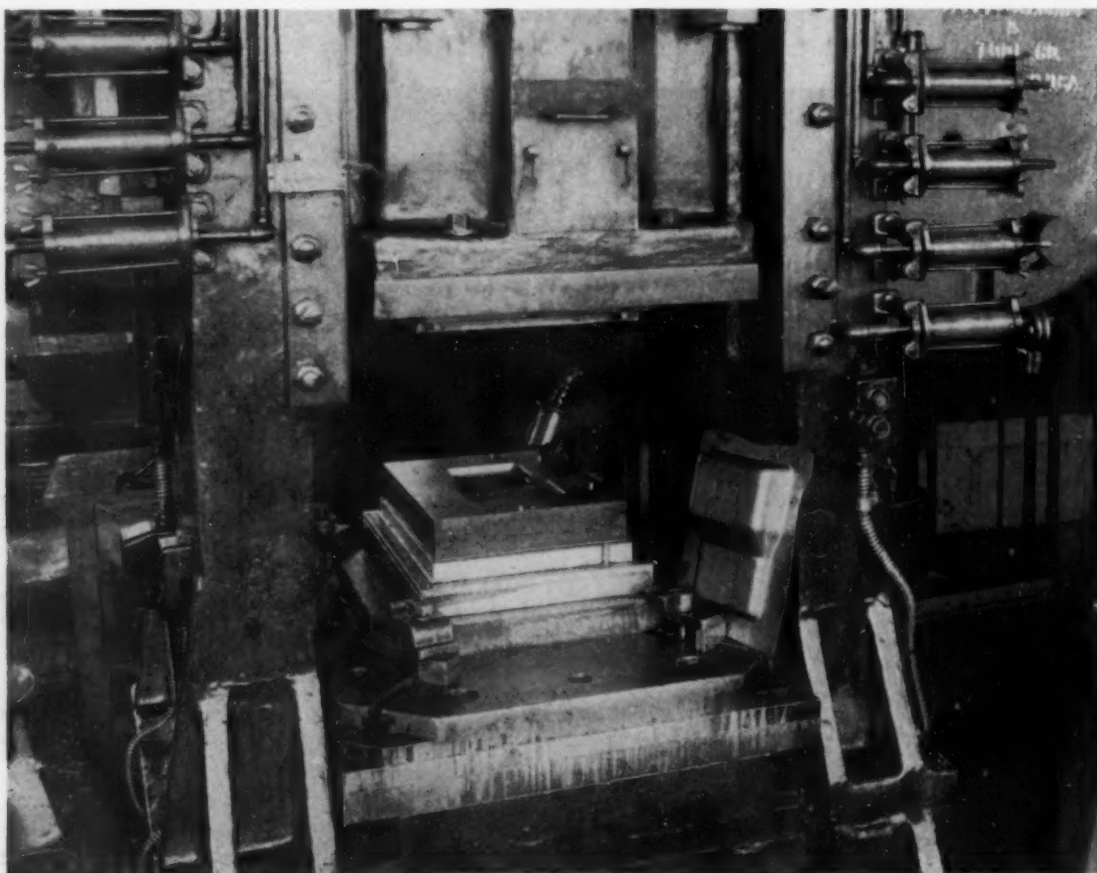


FIG. 3—A draw die for a switch box.

can be done either by making and inserting a piece into the tool, or by reducing the hardness so that the tool part becomes tougher and less brittle. This will reduce the breakage hazard. One of the large types of blanking dies is shown in Fig. 1.

Slot dies of both the single and multiple types are shown in Fig. 2. These dies are made from the same kind of material and hardened in the same manner as the compound dies because they are very high activity tools.

Draw dies are made up usually with either hot rolled steel or cast iron frames and edged on the drawing surfaces with tool steel. The steel edge pieces are made to suit the job and are set in place and held with bolts and are usually interlocked and doweled. A draw die for a switch box is shown in Fig. 3.

AT RIGHT

FIG. 4—A universal die, set into a special die shoe.

o o o

BELOW

FIG. 5—The air valve is used to blow out the finished blanks and the pliers are used for loading the semi-finished blanks.

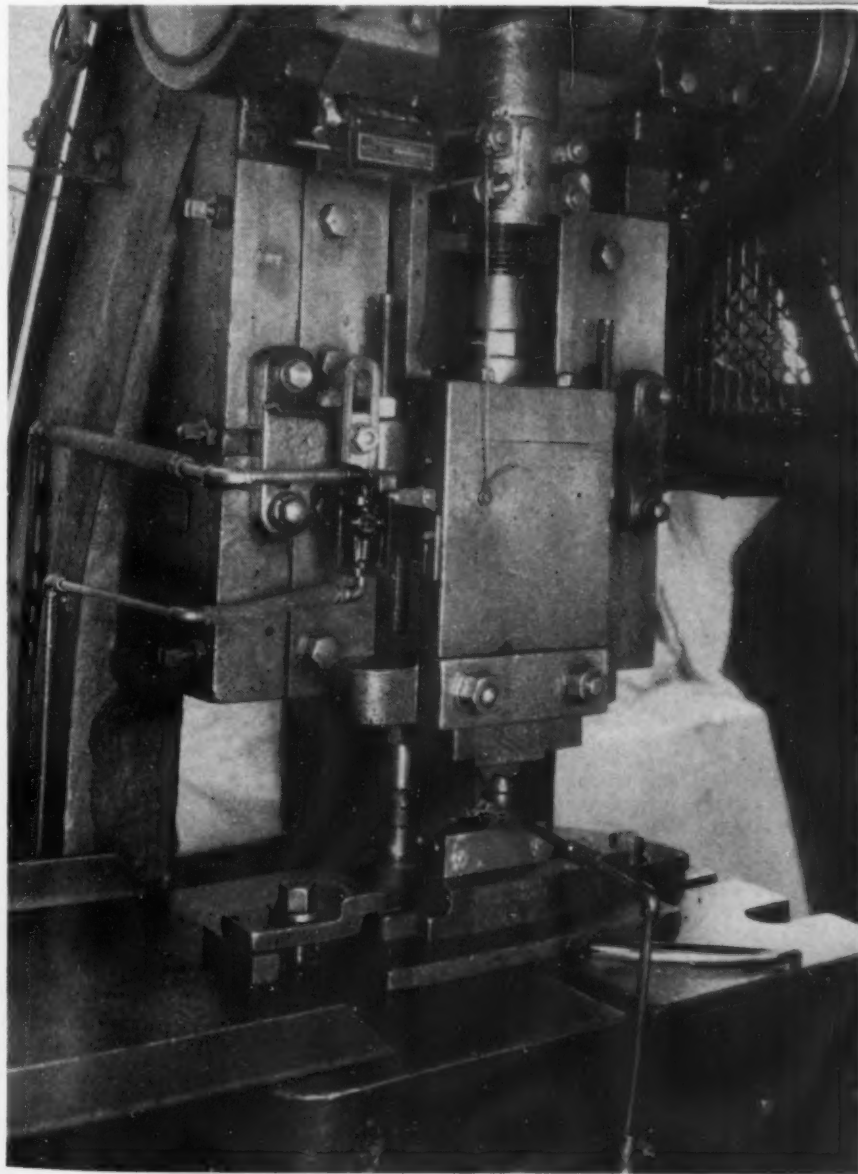
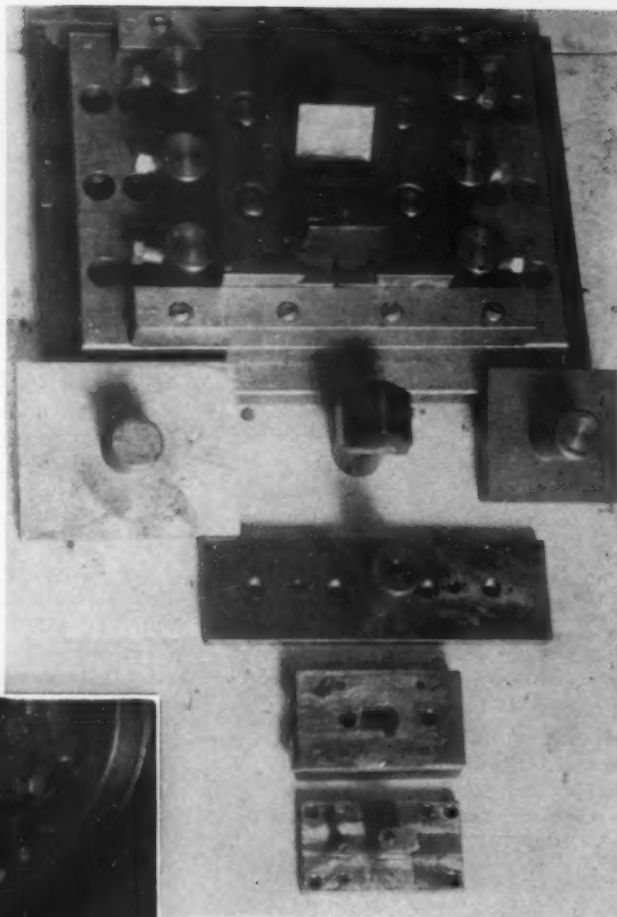


Fig. 4 illustrates a universal die set into a special die shoe. These die sets were made specially for use on small order tools. Such tools are made practically the same as the ones described under the heading of progressive dies, with the exception that they have a 15-deg. taper machined. There are two corresponding tapered parts on the die set and with their aid the dies are held in position by tightening the screws along the sides, as can be seen in the picture.

There can be no such thing as too much safety in the stamping department. The tool designer must incorporate safety in his design of the tools. They must be made as nearly foolproof as possible. In addition, safety measures are provided by the company and all press operators are required to use them. Fig. 5 shows an air valve that is used to blow out the finished blanks from the tool and the loading pliers that are used for loading the semi-finished blanks into the benders. At no time is the press operator allowed to place his hands into a hazardous position. Screens that keep both hands and foreign objects out of the dies are placed in front of the tools when it is possible.

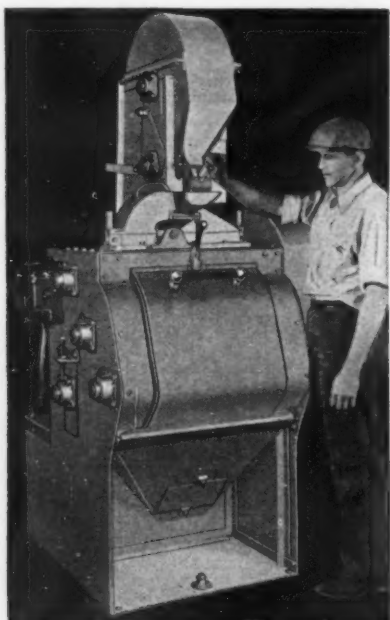
WHAT'S NEW IN CLEANING AND FINISHING EQUIPMENT FOR METAL PRODUCTS

FOR cleaning castings, forgings, stampings and heat-treated parts in limited loads, the *American Foundry Equipment Co.*, 555 S. Byrkit Street, Mishawaka, Ind., has brought out a 15 x 20-in. airless Wheelabrator Tum-Blast with operating capacity of 1 cu. ft. Like other Wheelabrator units, this machine uses metallic abrasive fed through a centrifugal blasting wheel. The cleaning chamber is formed by an apron conveyor faced with abrasive resisting rubber. The movement of this conveyor tumbles and cascades the work directly beneath the blasting unit so that all surfaces of the work ultimately come into contact with the blast.

After striking the load, the abrasive falls through perforations in the conveyor belt to a hopper connecting with a bucket elevator which picks up the abrasive and returns it to a storage hopper after first separating out the dirt. A single 3-hp. motor provides power for all operating units.

Continuous Degreaser

A RETURN-TYPE conveyor form of one-dip Detrex degreaser has been designed from the point of view



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By FRANK J. OLIVER

Associate Editor, *The Iron Age*

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of exceptionally low maintenance. Through the use of a continuous solvent still and filter, the machine requires cleaning only about every two and a half months in spite of heavy carry-in of dirt, metallic chips and oil. The conveyor is completely self-contained with the load and unload stations extending approximately 19 ft. from



ABOVE

MAKERS of vitreous enamel products are de-enameling defective sheets or parts that are ordinarily a total loss with the aid of a new sand blast gun recently introduced by Michiana Products Corp., Michigan City, Ind. The gun has five outlet nozzles or orifices through which the sand is discharged with a brush-like action, cleaning without peening or distorting sheets of 19-gage and lighter. This gun may also be used for cleaning soft materials, like wood, which would be damaged by a single nozzle blast.

• • •

AT LEFT

THIS 15 x 20-in. Wheelabrator Tum-Blast cleaning machine has a capacity of 1 cu. ft. It is designed for handling comparatively small products in limited loads.

the machine. The work is lowered on special fixtures and the cleaning cycle consists of immersing the work in boiling solvent and passing it out through solvent vapors. At the exit end of the degreaser there is a light oil spray system that can be used to rustproof the work if desired.

The solvent in the machine is heated by a steam coil mounted in a remov-



BY turning a handwheel at the top, any desired spindle speed from 1000 to 3500 r.p.m. can be obtained on this new Hisey infinitely variable speed buffing and polishing machine. Speed changes are effected through a multiple V-belt drive and may be made while the machine is under load. An indicating dial reads directly in r.p.m. This type of polisher is made in 3, 5 and 7½ hp. sizes, by the Hisey-Wolf Machine Co., Cincinnati.

• • •

able clean-out door, and there is also a steam jacketed bottom on the boiling compartment. This combination of steam coils and jacket gives the boiling solvents a vigorous rolling action which removes any insolubles from the work. The solvent still and filter remove all oil and insoluble contamination so that the boiling chamber is always full of clean solvent.

This machine is manufactured by the *Detroit Rex Products Co.*, 13005 Hillview Avenue, Detroit, in a wide range of sizes and capacities, but the unit pictured has the following approximate dimensions: length, 37 ft., width, 7 ft. 8 in., and height, 12 ft. 4 in. The work clearances through the degreaser are 12 in. long, 16 in. wide and 28 in. deep. The conveyor consists of a 4-in. I-beam track complete with a traction wheel inside the unit and a 30-in. drive sprocket and variable drive unit outside. Solvent capacity of the boiling chamber is 188 gal. and the rated capacity of this particular machine is 10,000 lb. of work per hr.

Spray Rinse for Plated Work

NEWLY introduced by *Storts Welding Co.*, 114 Stone Street, Meriden, Conn., is the Vortexeddy spray tank especially designed for racked parts rinsing in electroplating departments. The rinsing operation is performed by alternate vortexes of spray streams circulating clockwise and anti-clockwise, and interrupted by other straight line spray streams which produce a multiplicity of eddies moving in as many directions. Provision is made for turning the work so that every portion of the surface is subjected to the impact of the high velocity atomized rinse water from numerous angles. Water flows only while the work is in rinsing position.

Two advantages claimed for this method over the still-water rinse are



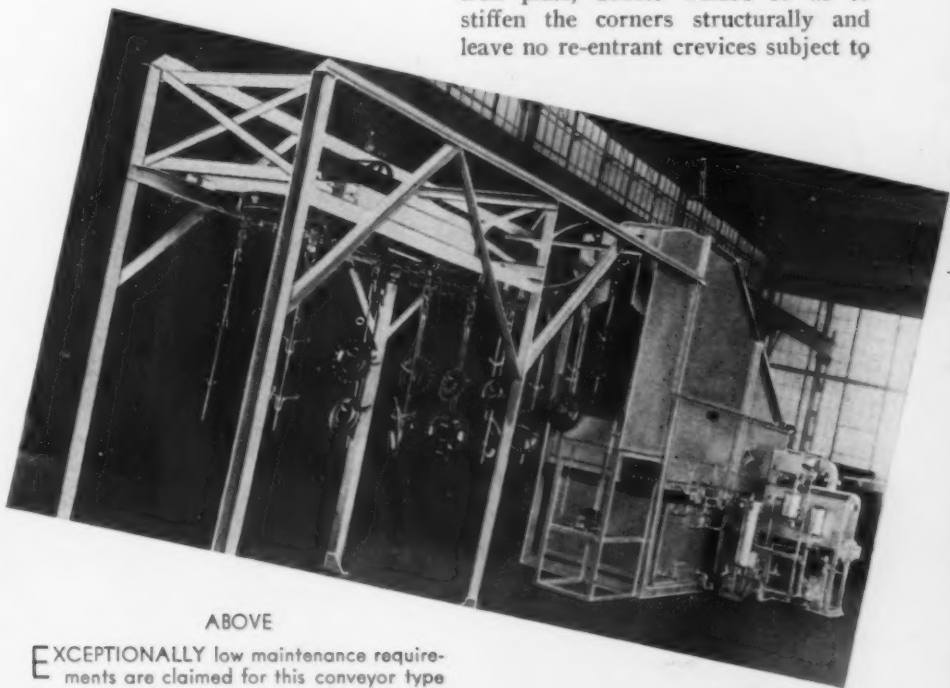
TO its line of air-driven sanders, *Sterling Products Co.*, 2457 Woodward Avenue, Detroit, has added this Gyro electric sander. Operating at 4000 r.p.m., it has a gyratory motion that is said to eliminate any graining effects. The flexible sanding pad closely simulates a hand sanding motion but does the work in a fraction of the time. It uses one-quarter of a standard 9 x 11-in. sheet of any type of abrasive paper. Weight is 3½ lb., but the machine is said to be constructed for continuous service.

A NEW shot blast machine fills the need of a semi-automatic unit for cleaning small parts in small batches. Sanding and polishing machines are also described in this correlated digest of recent announcements of the manufacturers. Advances in plating technique are facilitated by a new form of spray rinse equipment instead of the tank dip, the introduction of a new form of plating barrel and also of a copper-oxide type rectifier for individual tank use in place of a motor-generator set supplying several tanks. Several designs of spray guns have appeared on the market, as well as two new types of portable compressors for this service. Accessory apparatus for spray booths is described, together with a number of new finishes for metal products.

savings in water consumption from 38 to 86 per cent, and a time saving up to 65 per cent. The more energetic rinsing action is said to accomplish a cleaner rinsing, which allows the use of more effective cleaning agents that are not now widely used because they are so difficult to rinse. Contamination of acid and alkali solutions is eliminated and one spray tank can be made to replace from two to four still rinse tanks by a cross aisle arrangement of the plating cycle.

Both foot-pedal and hand-lever types are available, either right or left hand. Standard sizes are: 24 x 24 in. by 36 in. deep with 21 in. diameter top opening; 30 x 30 in. by 36 in. deep with 27 in. diameter top opening, and 36 x 24 in. by 36 in. deep with 33 x 21 in. oval top opening. Special sizes can also be furnished to suit rack and work dimensions.

The tank itself is of Armco ingot iron plate, double welded so as to stiffen the corners structurally and leave no re-entrant crevices subject to



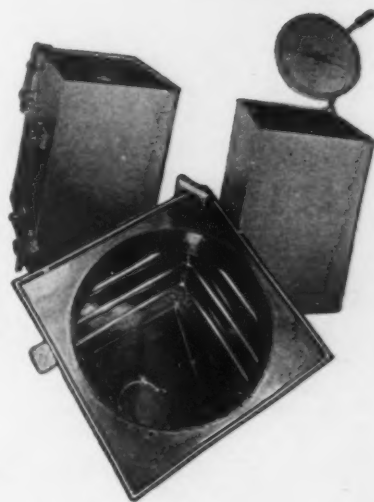
ABOVE

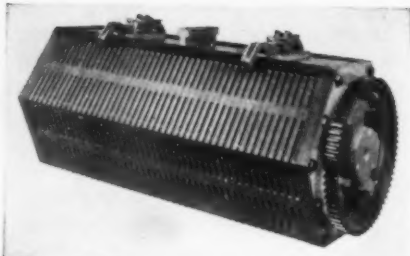
EXCEPTIONALLY low maintenance requirements are claimed for this conveyor type *Detrex* one-dip degreaser, equipped with continuous solvent still and filter. The size shown, which is typical, will handle work 12 in. long by 16 in. deep and 28 in. high. Rated capacity is 10,000 lb. of work per hr.

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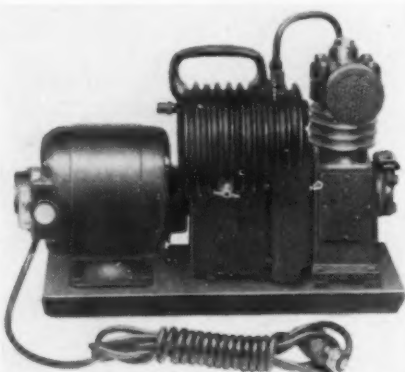
AT RIGHT

VORTEXEDDY spray tank especially designed for rinsing of racked parts in electroplating departments, using multi-directional high pressure sprays instead of a dip rinse. Saving in water consumption and in time are claimed by the maker, the *Storts Welding Co.*

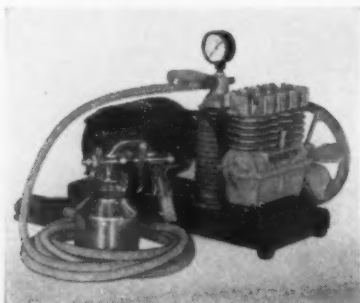




MUCH longer wear life is assured this laminated rubber plating cylinder which has molded rubber sections $\frac{3}{4}$ in. thick in place of the usual $\frac{1}{4}$ in. panels. Rigidity is supplied by steel support ribs on 4 in. centers. The plating operation is speeded up by employing slots in place of a number of round perforations. Standard openings are $\frac{1}{4}$, $\frac{1}{8}$ and $\frac{1}{16}$ in. These slots also may readily be cleaned. This new style plating barrel is a product of the Crown Rheostat & Supply Co., Chicago.



FOR medium and small light duty spray equipment, the DeVilbiss Co. is offering a new direct drive spray painting outfit driven by a $\frac{1}{3}$ -hp. motor. Compressor is of piston type and has a displacement of 4.58 cu. ft. per min., holding a DeVilbiss type GC spray gun at $38\frac{1}{2}$ lb. pressure. The finned air chamber relieves pulsation and serves as an oil and moisture separator. Flywheel is a fan type and is counterbalanced. Unit has safety valve, drain and connection for hose.



THE Empire Pressure King four-cylinder piston type compressor can be used to supply any size of spray gun not requiring over 5 cu. ft. per min. of air, although the unit can deliver 7.1 cu. ft. when belted to a $\frac{1}{2}$ -hp., 2300 r.p.m. gas engine. The same compressor may be belted to a $\frac{1}{3}$ or $\frac{1}{2}$ -hp. 1750 r.p.m. electric motor as shown. Valves are of disk type, made of stainless steel. The finned air cleaning chamber filters the air and removes water, oil and impurities. Compressor unit conforms to modern automotive engine practice. It is made by the Empire Compressor Mfg. Co., Inc., Reading, Cincinnati.

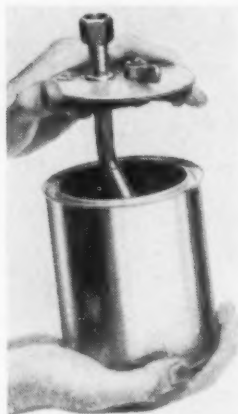
corrosive attack. The inside area is double coated with resinous corrosion resisting material and the outside is finished with two coats of aluminum asphalt paint. Spray coils are made of standard brass pipe, and the spray nozzles and all other fittings are brass or bronze.

Insulating Joints for Electro-Chemical Pipe Lines

TO eliminate the possibility of electrical grounds through the pipe lines transmitting solutions in electro-



TYPE AC DeVilbiss spray gun is especially suited for delicate tinting, fine stenciling, blending and high lighting, supplying a range of service from the drawing of a fine pencil line to the laying of a broad, soft spray up to 3 in. wide. Three nozzle combinations are available. Supplied by the DeVilbiss Co., Toledo.



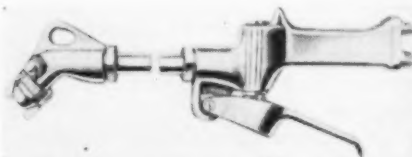
MASTER C-3 Econ-O-Can syphon feed cover for spray guns fits standard quart size friction top paint cans. Thus it is possible to keep different colors in their original containers ready for instant use. Sets of six to 12 quart-size containers can be had with the cover or the empty cans can be purchased separately in sets from the Burning Brand Co., 1400 W. Fulton Street, Chicago.

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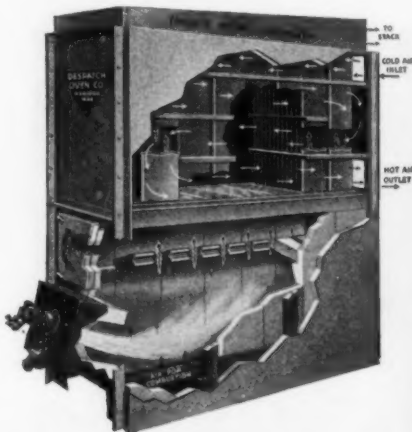
chemical processes such as electroplating, best practice is to use insulating joints in the lines. A complete assortment of such insulating joints is now obtainable from the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. These joints are made of malleable



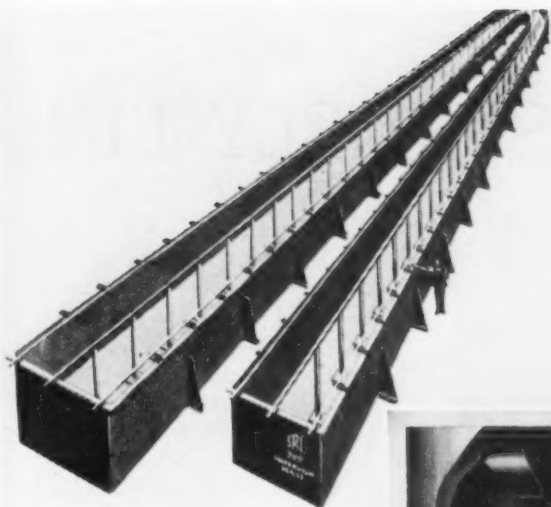
G-E HAND operated voltage regulator for use with a new line of copper-oxide rectifiers suitable for electroplating service. The regulator has 36 steps of adjustment, giving a voltage range from maximum (6 or 12 volts) down to 1 volt. An accurate ammeter and voltmeter give the current and potential at the tank. The regulator is connected ahead of the rectifier so that the latter never operates at full load unless required.



THOR Model No. 23 spray gun was designed primarily to allow the operator to apply paint to surfaces that are ordinarily out of reach, such as truss work and girders. It is a one-piece extension type made in lengths of 3 to 7 ft. A knurled screw placed directly behind the nozzle head controls the width of spray. Made by the Binks Mfg. Co., 3114 Carroll Avenue, Chicago.



NEW Despatch indirect air heater of 500,000 B.t.u. rating is suitable for baking ovens and dryers, as well as space heating. A single burner is used of the low pressure proportioning type, keeping a constant air-fuel ratio, whether oil or gas is used. The heat exchanger consists of 88 tubes, staggered to produce the greatest wiping action of the air as it passes through the exchanger, but keeping the resistance low. A heavy duty alloy protecting plate shields the tubes from the radiant heat of the combustion chamber. In fact, the burner is so arranged that there is no direct flame impingement on any metal part. This equipment is offered by the Despatch Oven Co., Minneapolis.



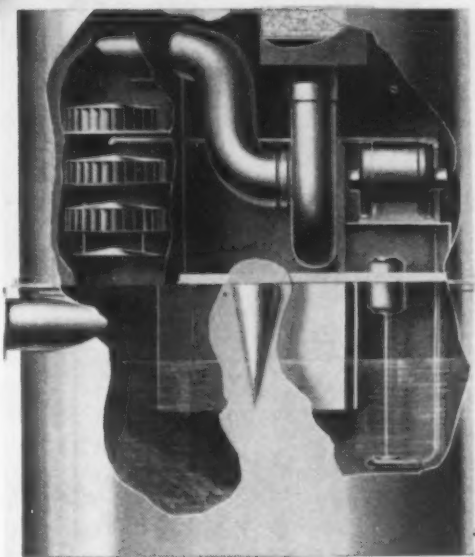
AT LEFT

WORLD'S longest plating tank is this one for bright nickel work, measuring 162 ft. in length. The tank is lined with Impervium seamless rubber lining (SRL) and the exterior is covered by a rubber paint. The tank was built in seven parts. Its construction and lining was done by Paramount Rubber Service, Inc., Detroit.

iron and include compressed fiber insulating rings which encircle the ball member at two different places. They are tested for 125 volts d.c. service and for 200 lb. per sq. in. steam pressure. They may be safely used under hydraulic pressures as high as 1000 lb., depending upon the size of the joint. Inherently flexible in design, they prevent pipe breakage due to expansion, contraction or vibration strains.

Anode Bags

ANOTHER new development of the Hanson-Van Winkle-Munning Co. is the style D anode bag, made from a closely woven sanforized drill material. The bags are 5 in. wide, single ply with a special sewing, and are fastened to the anode by two pieces of tape which pass through holes punched in the top of the bag. A particular feature is that the bags are coated with resin for several inches at the top where the material is alternately exposed to solution and air, and also at the bottom where the sludge collects. This sludge is largely



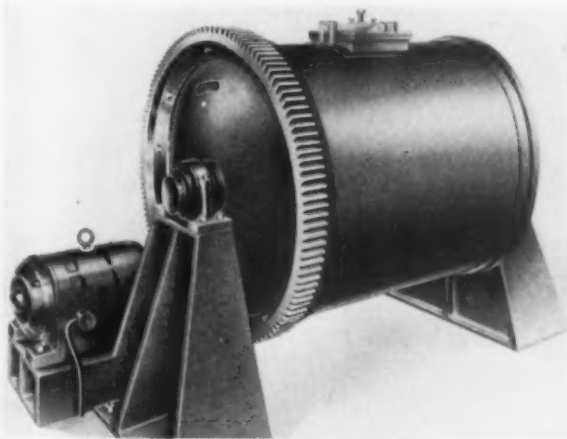
ABOVE

OPERATING on the same principle as the entrained liquid separator used in Schneible multi-wash wet dust collectors, this entrainment separator, announced by the Claude B. Schneible Co., is designed to remove free moisture from air that is venting washing, pickling and plating processes and to extract oils, lacquers, solvents and coatings from spray booth ventilating air.

• • •

AT LEFT

A TYPICAL member of the new line of ball and pebble mills manufactured by the H. K. Porter Co., Inc., Pittsburgh, for many years maker of industrial switching locomotives. All mills are mounted on self-aligning ball bearings of high capacity. Unlined mills are constructed of high carbon steel of high tensile strength, and mills up to 36 in. diameter are made with seamless formed dished heads of the same material. Mill stands are of electrically welded steel construction. The only cast iron used is in the door and door frames, which do not come into contact with the materials being ground.

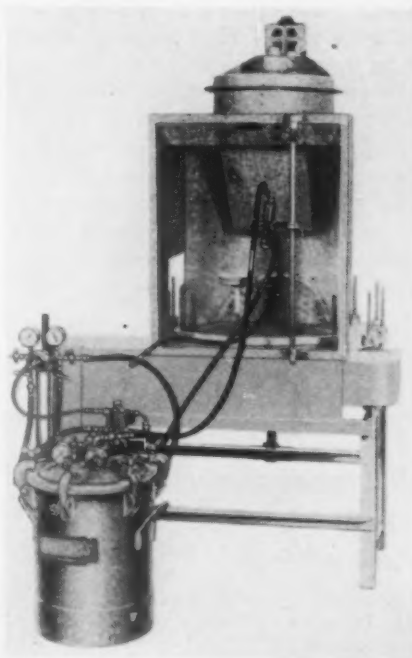


composed of finely divided carbon which seeps through untreated cloth, even with the slightest agitation. The resin varnish prevents this contamination. Besides retarding bag failure at the top of the bag, the resin coating at that point stiffens the bag and makes a simpler fastening possible and one that does not bunch the cloth around the hook to act as a capillary wick. The red resin on the white bag also serves as a visual solution level indicator.

• • •

BELOW

INSTALLATION of proper workholders permits finishing of a variety of different small parts on this light duty, semi-automatic spray finishing machine, introduced by the DeVilbiss Co. Production range is 400 to 3000 articles per hr. Length of spraying period is adjustable, and the speed of the table may be adjusted through a variable speed drive. A cam may be provided so that every second spindle only is sprayed. The machine, known as type YB-5103, is equipped with turntable, spindles, automatic spray gun and control valve, air transformer, material tank, hose and connections. The 15 spindles rotate on ball bearings.



Rectifier for Plating Service

AFAN - COOLED copper - oxide rectifier suitable for electroplating service has been made available in several ratings by the General Electric appliance and merchandise department, Bridgeport, Conn. The new rectifier is an adaptation of the G-E fan-cooled copper-oxide rectifier that has been used successfully in various industrial applications. In apply-

(CONTINUED ON PAGE 82)

THIS WEEK ON THE

By W. F. SHERMAN
Detroit Editor

ASSEMBLY LINE

... Auto production jumps to 115,488, with near-record now seen likely for fourth quarter ... Purchasing agents reverse buying trend and increase hand-to-mouth purchases ... Monumental engineering building to house Detroit technical groups ... UAW strike ban is drastic blow at wildcat walk-outs and slowdowns.

DETROIT—Outlook for automobile production totals for the last quarter of the year is much brighter, with December levels unexpectedly good. The return of Chrysler Corp. plants to full time operation in the last week sent automobile assembly totals to the highest point since the week of July 12, 1937, and resulted in an upward revision of the industry estimate for the month and the final quarter.

Statistics in Ward's Automotive Reports reveal that last week's production was 115 488 passenger cars and trucks, compared with 93,638 in the previous week and 100,705 in the corresponding week of 1938. Assuming continued

production at this rate, a total of 450,000 units will be assembled in December, which would be the best volume ever achieved during December excepting 1936. It is also expected that fourth quarter operations will bring the second best production for the period in the history of the industry.

Attempting to catch up on volume lost during the labor disturbance, Chrysler factories completed 25,980 cars and trucks, of which 10,720 were manufactured by Plymouth. General Motors operations showed virtually no change, turning out 48,925 units against 48 809 in the previous week. Chevrolet remained steady at 28,000. Ford Mercury assemblies totaled 23,

500, as contrasted with 24,000 a week earlier; Lincoln-Zephyr output was increased from 665 to 725.

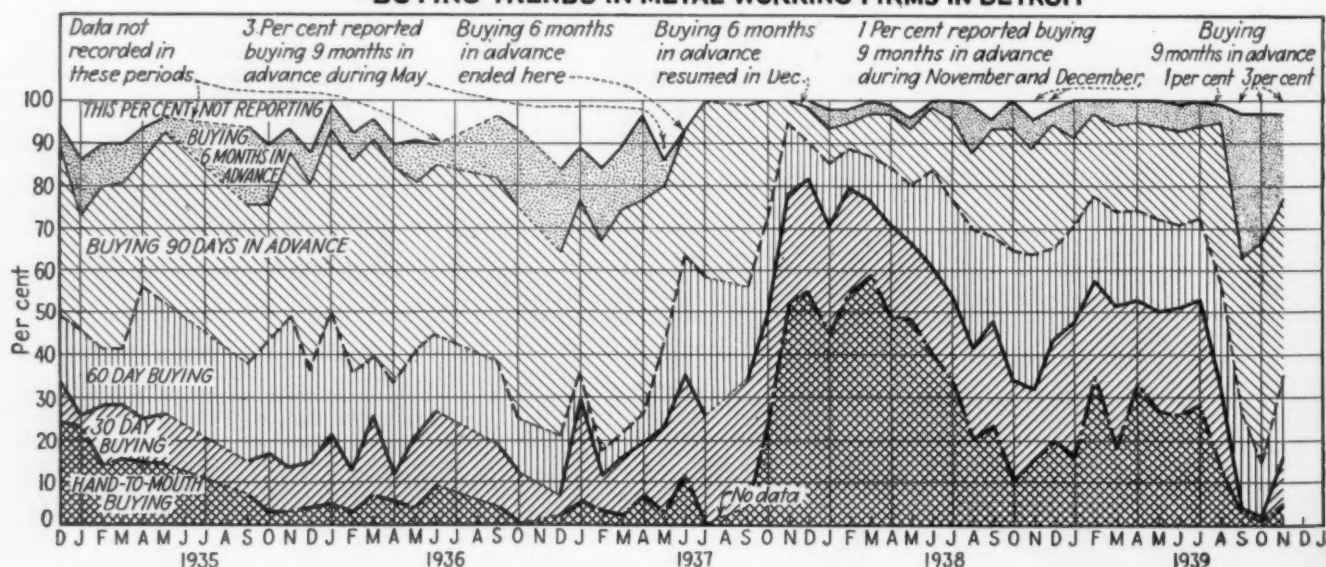
The record for the best quarter was established by the industry in 1936 when assembly totals reached the all-time high of 1,154,806. While there is no possibility of hitting that mark this year, it is believed probable that about 1,135,000 cars and trucks will be completed before Jan. 1.

Sales at High Level

Automobile sales continue at unusually high levels and no dropping off in the rate of incoming orders has been detected. Buick is a good indicator on this score, and the most recent figures, those for the last 10 days of November, show that the pace has not slackened. Domestic retail deliveries for the last 10 days of the month were 10,385, whereas the first 20 days resulted in only 18,907 deliveries. This indication of an acceleration of deliveries during November actually is a general picture. It is an indication also of the number of sales being made, although sales reports do not always correspond exactly with delivery reports.

The used car situation is very sim-

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Prepared by THE IRON AGE from
data supplied by PURCHASING
AGENTS ASSOCIATION OF DETROIT

These data cover a wide industrial
field, including stove, refrigerator,
office equipment, steel, auto parts,
accessory and auto plants

Just off the Press!



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LATHES

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who will request
it on his Company
Letterhead*

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Here, under one cover, is the complete information
you wanted on precision lathes—Pratt & Whitney
Model "C" Lathes—the standard by which all fine
lathes are judged. Write for it today.

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HARTFORD, CONN.

Division Niles-Bement-Pond Co.



CHEERS greeted the first De Soto off the final assembly line after the Chrysler strike was settled. Here, L. G. Peed, vice-president in charge of sales (fifth from the right) joined the workmen in celebrating the return to volume production. Within an hour after the men reported to work, assembly and sub-assembly lines were moving smoothly. De Soto shipping department has requisitioned freight cars equivalent to a solid train load every working day in December and in addition, 850 truck transports, designed to carry automobiles, will be required. De Soto production will be one a minute until backlogs of orders are cleared up.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



ilar, and again Buick dealers supply the figures. During the last 10 days of November they sold 14,696 used cars, compared with the sale of 24,543 during the first 20 days. Here, again, an accelerated rate in the final period is indicated.

Because sales of trucks and commercial vehicles are a reliable index of general business and industrial trends, much interest has been evidenced in Chevrolet's announcement that the final capitulation on its November truck sales would approach or exceed the company's all-time truck sales record for that month. According to W. E. Fish, truck sales manager, "periods of high truck volume, the records show, have consistently turned out to be forerunners of quickened activity throughout the commercial world."

Buying Ahead Curtailed

A reversal in forward buying attitudes on the part of industrial purchasing agents occurred during November in the Detroit area. Hand-to-mouth buying increased to 5 per cent, compared with 1 per cent a month earlier; 30-day buying jumped to 11 per cent, compared with 1 per cent in each of the previous two months. A similar increase in 60-day buying was reported, with 19 per cent in this classification as contrasted with only 13 per cent a month earlier. Long term buy-

ing—three to six months in advance of requirements—suffered losses of 10 per cent in each classification. Now, only 42 per cent of the purchasing agents are buying 90 days ahead and only 20 per cent are buying six months ahead, according to the Purchasing Agents Association. A 3 per cent group continues to buy nine months ahead.

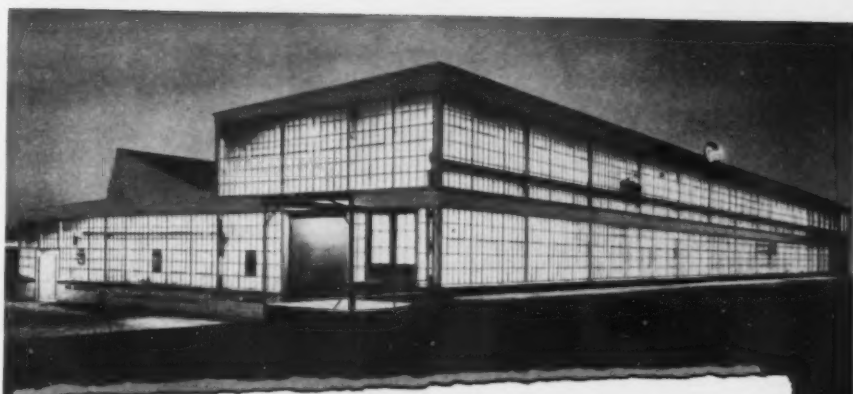
It is difficult to appraise the foregoing report on a very broad scale, although it is believed to indicate rather general national conditions. However, local influences, such as the major labor troubles of recent months in Detroit, have had an important effect. Not only sentiment, but facts regarding the movement of material and supplies, enter into the picture here. Suppliers, who would have had great difficulty keeping up with the demands of all of the automobile industry, found that the Chrysler strike gave them a breathing spell. Also it enabled many buyers to accumulate inventories sufficient to warrant a reduction in forward buying.

New Engineering Building

The Engineering Society of Detroit has announced final plans for one of the country's most imposing professional buildings. Construction will begin early in 1940 and the building will be ready for occupancy in the spring of 1941. It will be occupied by the Society and its affiliated engineering organizations, including the Society of Automotive Engineers whose membership constitutes a large part of the total in the parent organization. The building is to be known as the Horace H. Rackham Educational Memorial and will be occupied jointly by the Engineering Society and the University of Michigan Extension Service. Site for the building adjoins the Detroit Institute of Arts and is just across Woodward Avenue from the Detroit Public Library, main building. Estimated total cost, including land is \$1,500,000.

Horace H. Rackham, who died in 1933 and left a fund for this work, made his fortune from a small investment in the Ford Motor Co. He borrowed the money to make the investment when the company was formed. Since the establishment of the Fund which contributed the cost of the building, Mrs. Mary A. Rackham has assisted generously. Trustees of the Rackham Engineering Foundation comprise a distinguished list of names; they are Alex Dow, president of Detroit Edison Co.; Edsel Ford, president of Ford Motor Co.; Standish Backus, president, Burroughs Adding

(CONTINUED ON PAGE 74)



AN *Invitation* TO INSPECT THE **CIMATOOL PLANT**

A personal inspection is the best way to fully appreciate the facilities, capacity and possibilities of such a plant as that of the Cimatool Company. This new plant, thoroughly modern, and the organization which operates it has a background of 33 years of successful service.

Cimatool specializes in both the design and fabrication of machine tools, dies, fixtures, tooling, special and single purpose machinery and tooling programs. Any or all phases of this work are handled depending on the nature of the customer's problem. Cimatool also handles design only programs, producing complete working drawings for the customer. This is advantageous because of the wide experience and large design organization maintained by Cimatool at all times.

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CUT MASTER Cuts Time

16 feeds .0026" to .500" . . . 20 table speeds from standard low to a new high . . . sufficient power, rigidity and speed for carbide tools . . . power traverse for all heads.

CUT MASTER Assures Accuracy

Massive one-piece column and bed . . . Heavy Timken Roller Bearing Spindle . . . Screw Feeds in all Directions of Main Heads . . . Positive Pressure Lubrication . . . Inbuilt accuracy produces accuracy . . . new design 3 jaw chuck which triples the clamping power.

with Heavier, Faster Cuts

Above is an actual photograph of a 64" Cut Master spindle. These bearings take a load that is many times the capacity of the largest possible plain bearing for the same size machine. This permits heavy cuts and high speeds without impairment of accuracy. A greater proportion of the power input is available for cutting due to this anti-friction mounting.

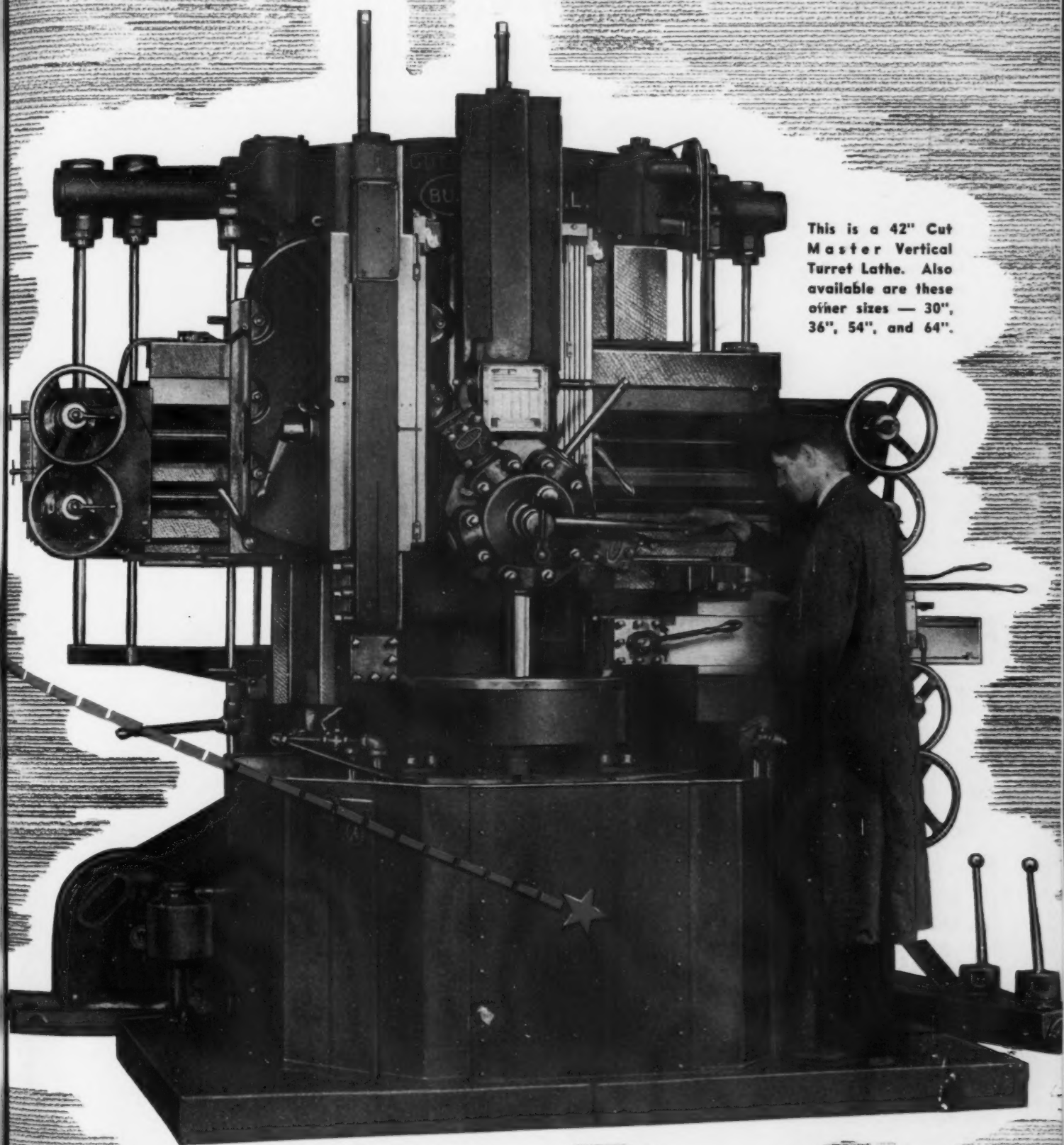
This combination is one of the principal reasons you save with Cut Masters. Send for complete data.

THE BULLARD COMPANY

Bridgeport, Connecticut

BULLARD

CUT



This is a 42" Cut
Master Vertical
Turret Lathe. Also
available are these
other sizes — 30",
36", 54", and 64".

MASTER

VERTICAL TURRET LATHE

THIS WEEK IN WASHINGTON

... Automobile steel inventories not excessive, Studebaker chairman tells TNEC ... U.S. contract with Colt includes obsolescence provision ... Thurman Arnold requests new force of 150 to watch industrial price movements.

By L. W. MOFFETT
The Iron Age

WASHINGTON — Expressing "reasonable optimism" over the domestic price situation if "means" can be found to guard against price rises on tin, nickel and rubber, representatives of the automobile industry told the Temporary National Economic Committee last week that the industry's tremendous buying power effectively polices prices in normal times but that today it is unable to cope with the price increases in rubber. The TNEC, some of whose members regard current inventories as "excessive," also was told that such is not the case in the automobile industry nor in the case of steel for automobile consumption. Competitive products going into the manufacture of automobiles were also characterized before the committee as an important factor in keeping prices down.

H. S. Vance, board chairman of the Studebaker Corp., who was accompanied by Paul G. Hoffman, Studebaker president, advised the committee on Dec. 6, on the general subject of prices, that the industry can and does "police the price of materials with an effectiveness little realized" but that it was helpless to prevent "unjustified" price increases resulting from influences abroad.

Causes Outside U. S.

The injection of the subject of foreign price control into the committee's sessions was considered of some significance because of the TNEC's assigned job of watching prices in view of war-stimulated demand in a wide range of commodities. It was widely reported that while price rises had occurred in some commodities, the committee had found that the increases were almost exclusively the result of causes outside the United States and that neither domestic manufacturers nor distributors for the most part had been responsible.

On the subject of inventories—one on which New Deal advisers have generally differed with business representatives—Mr. Vance declared that in his company they were 10 per cent less as of Oct. 1 than they were a year ago; and he expressed belief that that was probably true in the industry as a whole because of "the greater velocity of business."

Asked about the inventory situation in steel, the witness said that in his opinion the upsurge had not resulted in increased inventories. He told the committee that steel mills were not stocking steel for the automobile industry but that on the contrary "we're pressing them for deliveries."

No Large Inventories

"Neither are there large accumulations of steel in automobile plants," he said. "Such a situation would mean that production was running ahead of consumption, but that's not the case."

In addition to pointing out the part played by the automobile industry in the development of the continuous mill, Mr. Vance told the committee that without the industry's large volume the way might not have been paved for the great improvement taking place in machine tools, particularly in the case of large machines.

"The huge scale of automobile purchases is a perpetual inducement, not only to engineers and technicians of the manufacturers themselves but to suppliers and would-be suppliers, to develop substitutes or alternative materials or designs, at lower costs," Mr. Vance continued. "Thus, we have seen iron and steel replace aluminum in crank cases, gear boxes, and cylinder heads. We have seen the lightweight steel piston become a competitor of the aluminum piston."

The witness related that steel has replaced wood in automobiles, that stampings now compete with castings

and forgings, stainless steel with chromium plating, and plastics with both for many parts in a car and "one prevents the other from getting out of line in price."

"There are a few raw materials which are essential to car manufacture for which no adequate substitute has been found—for example, tin for bearings, nickel and other alloys for high grade steel, but happily, the quantities of these materials in the average automobile are small and the impact of their prices on the price of the finished product is in proportion," said Mr. Vance.

"Over-Competition"—Henderson

Up for discussion at the sessions were possible methods of curbing price advances, the inventory situation, the effect of pyramiding on prices, how prices in basic commodities affect retail prices, and related subjects. The representatives of the automobile industry were among other witnesses, who included purchasing agents, manufacturers and distributors.

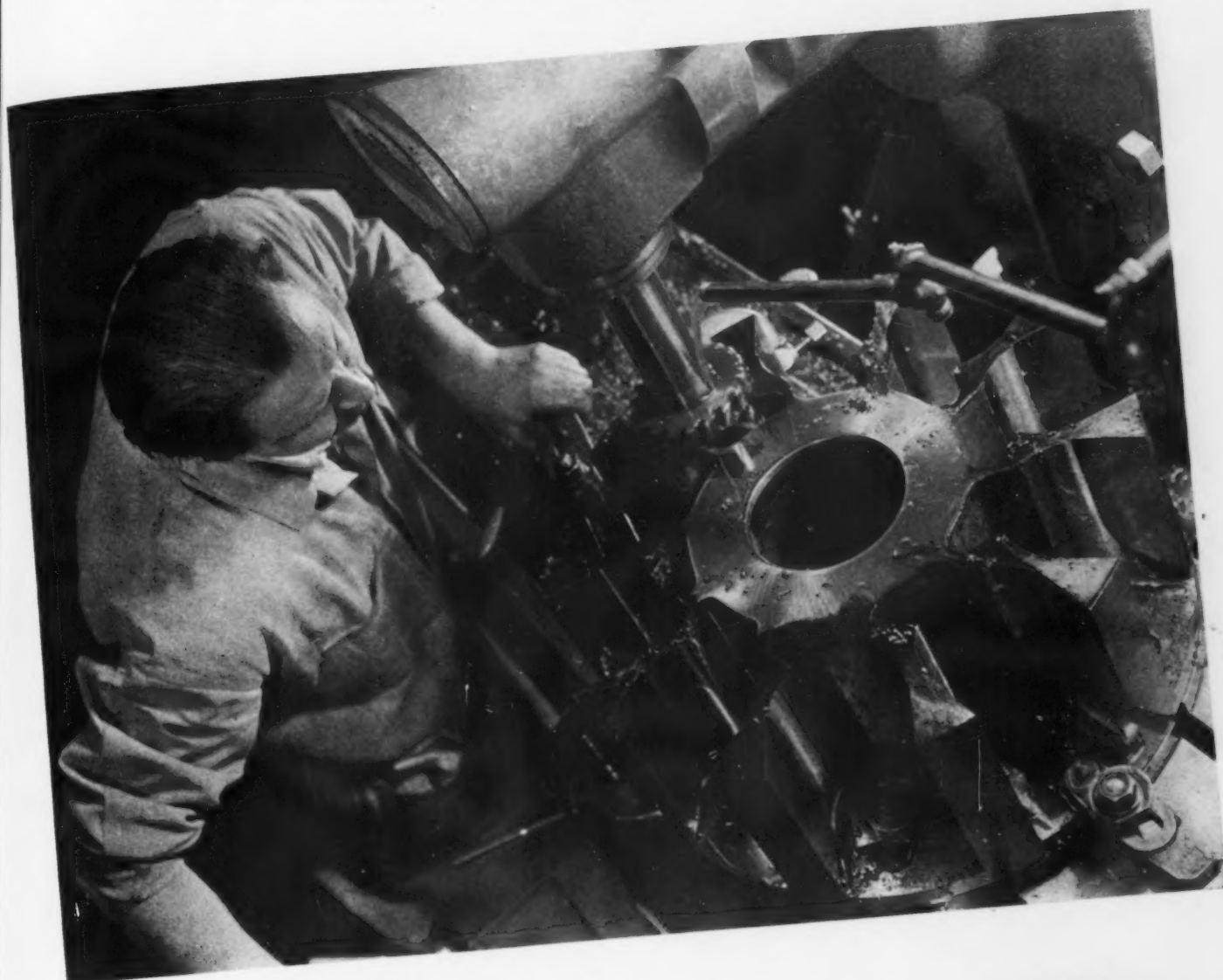
After the Vance statement about the industry's ability to "police prices," Leon Henderson, TNEC coordinator and member of the Securities and Exchange Commission, characterized the automobile industry as one in which there was "over-competition" or "almost a monopolistic tendency because of the tremendous buying power." He agreed that it was one of the greatest factors in keeping down the price of cars and suggested that if the same system could be applied to other industries the overall effect would be "worthwhile."

He subsequently qualified this remark, pointing out that the industry's tremendous buying power and the resultant keen competition raises the questions of "stewardship" and of "how far this buying power should go."

Mr. Henderson, the TNEC's "idea man," has made suggestions during the course of all TNEC hearings, frequently dealing with subjects involving greater Government participation with business activity but he vigorously disavows any intention of advancing the ideas as proposals.

Fresh from two weeks of hearings on the steel industry, Mr. Henderson interrupted at several points during the course of testimony by the Studebaker representatives to point out that information received at the steel hear-

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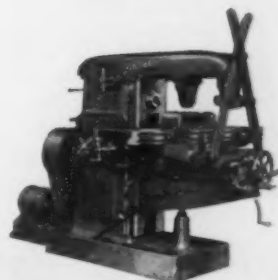
At the time the picture was taken, the operator was boring the pockets with a special milling cutter on a CINCINNATI No. 4 High Power Miller equipped with a Heavy Duty Vertical Attachment. Accuracy of these pockets must be right on the nose, or the vacuumizing process in the vacuum packing machine will be faulty, and profits will leak away rapidly.

No doubt the convenient controls which enable the operator to maneuver the work under the cutter had a lot to do with the selection of a CINCINNATI for such jobs. And then there's the inherent accuracy which means so much; the ability to take heavy cuts; rear controls for the jobs which hide the cutter; and many other profitable factors.

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C-F SHEET LIFTERS

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Tong action and automatic take up safely grip loads. End control protects operator.

BETTER

High grade stock handled without surface scratches or damage to edges.

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Handle packs of sheet steel instead of single sheets. Sheet storage room reduced.

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20 ton cap. Lifter in 80" strip mill

Also made for handling tinplate, ingot molds, paper rolls, pipe, tubing, castings, tote boxes, flasks, skids, etc. Capacities 2 to 60 ton. Special designs to suit your requirements.

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ings conflicted with statements by the automobile spokesmen.

"That's not the way I heard it from the steel people," the TNEC coordinator said when Mr. Vance told the committee that "the attitude" of the steel industry had been to adhere to base prices and to no others.

"I said their attitude was to stick to base prices," Mr. Vance explained. "There have been times when you can get price concessions and other times when it is much more difficult. It all depends upon supply and demand in the steel industry at a particular time.

"What's more important in the steel prices we pay is to watch the steel market and make up our mind as to when we find it advantageous to buy. Last spring the price of steel was very unstable. For a purchaser of steel, that was the time to buy in substantial quantities and that's what the automobile industry did."

As for his own company, Mr. Vance told Mr. Henderson further that it did not make any commitments but that it took an option, the consideration for which he said was "our future business and our good will." He expressed the view that his organization could not get the same prices today because of "strengthening" of steel prices. His testimony was that the company did not buy more steel when price concessions were being made, a reply which ran counter to the contention of Administration economists.

Price Control Stops Progress

After reference was made to the British price control over rubber, Mr. Henderson asked that would happen if the automobile manufacturers went in for a type of control for the purpose of controlling prices of rubber and other commodities.

Mr. Hoffman's reply was that the minute you inject price control into the industry's economy "you stop the trend toward progress." If the industry had exercised any form of price control in the past, the incentive to progress would have disappeared and the price for a sedan today would be still \$2,400 instead of around \$800, Mr. Hoffman testified, adding that in the manufacture of an automobile an improved method for making one part cheaper actually is "a matter of pennies."

"Does the price of steel make any difference?" Mr. Henderson asked.

"Certainly," Mr. Hoffman answered. "Every part of every car has an effect on automobile prices and costs."

Mr. Henderson, who observed that "you differ with the steel people on that," was told that any statement that

price has no effect upon volume is in error.

Mr. Henderson also drew from conclusions he gathered at the steel hearings the point that the "steel people took complete credit for the development of the continuous mill." This point was raised after Mr. Vance testified that the automobile industry had been responsible for the development because of its huge demands.

Demand Made Big Mills Possible

"The automobile industry does not seek the credit for the technical development," Mr. Vance said in clarifying his statement. "I merely said that the investment necessary for the development of the continuous mill would not have been warranted if it had not been for the automobile industry's demand."

Turning to the subject of price rises in commodities which domestic manufacturers are helpless to control, Mr. Vance explained that while the average price of rubber at Singapore had increased by 20c. to 25c. since August, there are substantial amounts of rubber awaiting shipping space. Mr. Vance turned aside a suggestion from committee members that he propose a method by which the industry could exercise some control to reduce the price of rubber but Mr. Hoffman suggested that if American public opinion could be brought to bear on foreign control of rubber prices it might prove effective.

WPA Studies Law Blocking Trade Between States

WASHINGTON — As the first recommendation of the interdepartmental committee established by Secretary of Commerce Hopkins to seek ways of eliminating trade barriers between states, the WPA's marketing laws survey is making an analysis of statutes as well as administrative orders responsible for impeding the free flow of commerce.

Under the direction of A. H. Martin, Jr., head of the white collar project which a few years ago attempted but later abandoned a survey on resale price maintenance laws, the new study will cover interstate barriers between nine eastern and southern states. It is expected to be completed before the convening of state legislatures in these states in January, 1940.

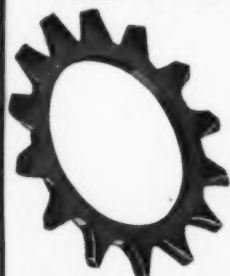
States to be covered are Massachusetts, New York, New Jersey, Rhode Island, South Carolina, Virginia, Mississippi, Kentucky and Louisiana.

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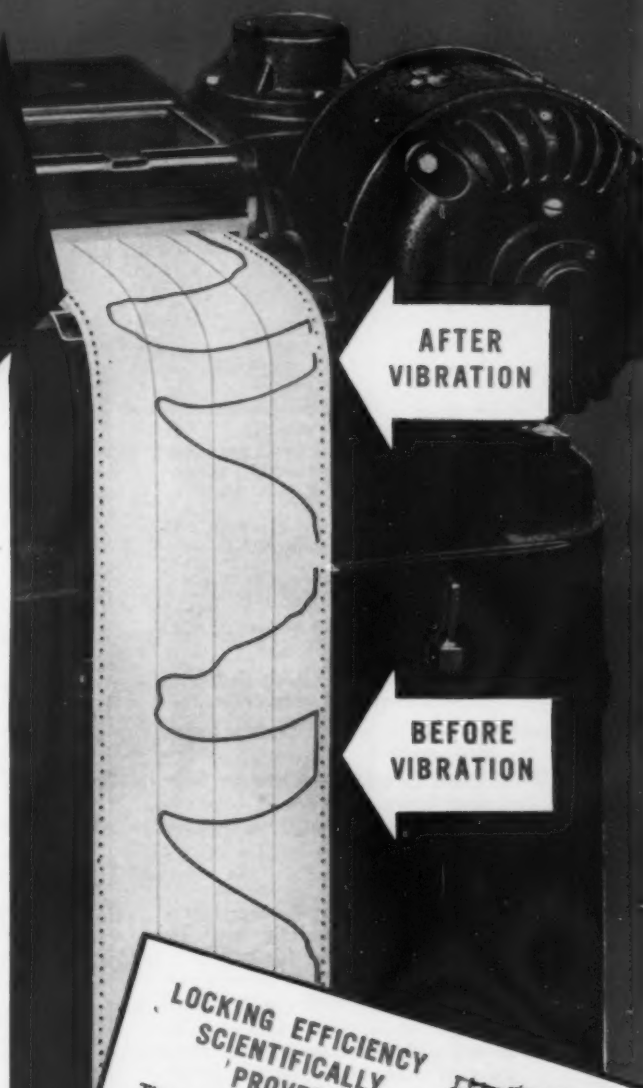
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VIBRATION

LOCKING EFFICIENCY SCIENTIFICALLY PROVED!

The Maximeter graph above shows the recording of the torque force values required to tighten and loosen a nut locked with a Shakeproof Lock Washer—both before and after vibration. Detailed explanation of these tests will be furnished to metal product manufacturers on request.



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Locking and Plain Terminals

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New, Longer-Life
RACK COATING



DEVELOPED by United Chromium, through extensive research "Unichrome" Rack Coating-W possesses the following outstanding advantages:

1. Withstands boiling cleaners and all plating solutions.
2. Tough—withstands wear and tear of normal handling.
3. Contains no ingredients harmful to any plating solution.
4. Cuts costs—by greatly reducing the frequency of recoatings.
5. Easy to apply—by "dip and force-dry" method.
6. Light in color—easy to see how completely the rack is covered.
7. Any part of rack can be recoated without necessity of recoating entire rack.

Thoroughly proved in actual service—and now regularly used by many plating shops—this new rack coating material has produced amazingly fine results.

Reports show that some racks coated with this material have gone through over 1,000 plating cycles without any insulation breakdown.

Write for Bulletin No. 15
containing complete information

Platers without rack dipping and drying facilities may have their racks coated with Unichrome Rack Coating-W by making arrangements with Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Illinois, or Lea Manufacturing Company, Waterbury, Conn.

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tween the states, regardless of the fact that the Constitution expressly forbids the erection of customs barriers," Mr. Martin said. "A truck operator, for example, may have to pay several hundred dollars in fees and special licenses for a single hauling job which crosses several state lines. . . .

"It is the purpose of the marketing laws survey to bring together for the first time a complete digest of these statutes, not only for the benefit of businessmen engaged in interstate commerce, but also for the guidance of the state and federal governments in devising corrective measures."

Government Steel Contracts

WASHINGTON—Iron and steel contracts placed by the Government during the week ended Dec. 2 totaled \$827,121, as reported by the Labor Department's Public Contracts Division. Awards for machinery amounted to \$1,368,460. Details follow:

Iron and Steel Products

McGill Mfg. Co., Washington, Naval Torpedo Station, ball bearings....	\$14,935
New England Structural Co., Everett, Mass., Boston Navy Yard, vertical lift doors	11,906
Crane Co., Washington, Navy S & A, fittings, pipe bronze	77,613
Pressed Steel Tank Co., West Allis, Wis., Navy S & A, afterbody shells	24,876
Heintz Mfg. Co., Philadelphia, Navy S & A, doors and hatches	81,011
The Steel Improvement & Forge Co., Cleveland, Navy S & A, propeller forgings	17,435
Carnegie-Illinois Steel Corp., Washington, Navy S & A, I-beams	15,280
Penn Galvanizing Co., Philadelphia, Navy S & A, steel beams	24,590
American Bridge Co., Pittsburgh, TVA, steel towers	203,952
Weatherhead Co., Cleveland, War Air Corps, connectors, etc.	16,248
Parker Appliance Co., Cleveland, War Air Corps, adapters, etc.	10,987
Carnegie-Illinois Steel Corp., Boston, War, Engineer Corps, steel sheet piling	14,664
McGill Mfg. Co., Valparaiso, Ind., War Ordnance, ball bearings	21,860
Carnegie-Illinois Steel Corp., Chicago, War Ordnance, carbon steel	41,625
Columbia Steel Co., San Francisco, Navy Purchasing Office, sheet steel	16,132
J. Bishop & Co. Platinum Works, Malvern, Pa., War Air Corps, steel tubing	10,557
Geuder, Paeschke & Frey Co., Milwaukee, War QMC, milk cans	21,600
Hart Mfg. Co., Louisville, War QMC, ranges	37,626
Kansas City Structural Steel Co., Kansas City, War Engineer Corps, trash racks	12,776
Bolt & Nut Division, Republic Steel Corp., Cleveland, War Ordnance, carriage bolts	17,134
F. A. Klaine Co., Cincinnati, War QMC, ranges	14,700
Sheffield Steel Corp., Kansas City, Mo., Interior, reinforcement bars ..	12,346
The Milton Mfg. Co., Milton, Pa., Navy Purchasing Office, steel nuts	10,875
Dravo Corp., Pittsburgh, TVA, steel armor	11,840
Bethlehem Steel Co., Bethlehem, Pa., War Engineer Corps, trash racks..	84,546

Other Machinery

The Lamson Co., Inc., Syracuse, N. Y., Navy Purchasing Office, pneumatic dispatch system	\$11,396
J. I. Case Co., Racine, Wis., Navy S & A, tractors	14,989

Tidewater Supply Co., Inc., Norfolk, Va., Navy S & A, lathe, turret ...	10,019
Northwest Engineering Co., Chicago, TVA, shovel	12,650
Norton Co., Worcester, Mass., War Ordnance, grinding machine	46,382
Landis Tool Co., Waynesboro, Pa., War Ordnance, grinding machines ..	12,370
S. Morgan Smith Co., York, Pa., Interior, hydraulic turbines	753,463
Crane Co., Philadelphia, Philadelphia Navy Yard, composition valves	10,972
Foot Co., Inc., Nunda, N. Y., Panama Canal, concrete mixers	18,800
Caterpillar Tractor Co., Peoria, Ill., Procurement, tractors	12,552
Inserting & Mailing Machine Co., Philadelphia, N. J., Procurement, inserting and sealing machine	10,520
Acme Machine Tool Co., Cincinnati, War CWS, lathes, turret	17,055
Lewis Bros. Co., Tulsa, Okla., War Engineer Corps, drill machines	18,246
Enterprise Tool & Gear Corp., Detroit, Navy Yard, Washington, D. C., gears and clutches	11,076
Esco Engineering & Sales, Inc., Detroit, Navy Yard, Washington, D. C., template, handles, cams	12,346
Ransome Concrete Machinery Co., Dunellen, N. J., Panama Canal, concrete mixers	27,376
Koehring Co., Export Office, New York, Panama Canal, concrete mixers	23,314
Chain Belt Co., Milwaukee, Panama Canal, concrete mixers	21,190
Ingersoll-Rand Co., Inc., Washington, Panama Canal, machinery	213,512
National Supply Co., Holmesburg, Philadelphia, Panama Canal, engines	14,844
International Postal Supply Co., Brooklyn, Post Office, canceling machines	31,875
R. K. LeBlond Machine Tool Co., Cincinnati, Treasury Coast Guard, lathes	10,000
Bullard Co., Bridgeport, Conn., War Ordnance, chucking machine	37,711
Jones & Lamson Machine Co., Springfield, Vt., War Ordnance, turret lathes	15,298

Defense Contracts Total \$8,680,857 in Two Weeks

WASHINGTON — Contracts aggregating \$8,680,857 were awarded during the period Nov. 16-30 under the 1939 procurement programs of the War Department, it was announced by Assistant Secretary of War Louis Johnson. Among the awards were the following:

Under the artillery ammunition program for ammunition parts: Scovill Mfg. Co., Waterbury, Conn., \$7,664; Standard Pressed Steel Co., \$28,380; Bridgeport Brass Co., Bridgeport, Conn., \$40,851; National Pneumatic Co., New York, \$4,971; Acklin Stamping Co., Toledo, \$71,400; Pollock Mfg. Co., Arlington, N. J., \$160,200.

Artillery material: York Safe & Lock Co., York, Pa., mounts for guns, \$694,188; Crucible Steel Co. of America, New York, liner forgings, \$47,125; A. Finkl & Sons Co., Chicago, forgings, breech rings, \$11,648.

Automotive material: Caterpillar Tractor Co., Peoria, Ill., tractors, \$322,097; Continental Motors Corp., engines, \$939,529; Guilberson Diesel Engine Co., engines, \$588,037.

Rehabilitation machinery: Warner & Swasey Co., Cleveland, rebuild and modernize turret lathes, \$4,887; E. W. Bliss Co., Brooklyn, engine and toolroom precision lathes, \$75,597; Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., toolroom precision lathes, \$25,848; R. K. Le Blond Machine Tool Co., Cincinnati, sliding bed gap lathe, \$13,921; Federal Machinery Sales Co., Chicago, honing and inclinable presses, \$12,978; Seneca Falls Machine Co., Inc., Seneca Falls, N. Y., multiple tool lathes, \$26,085.

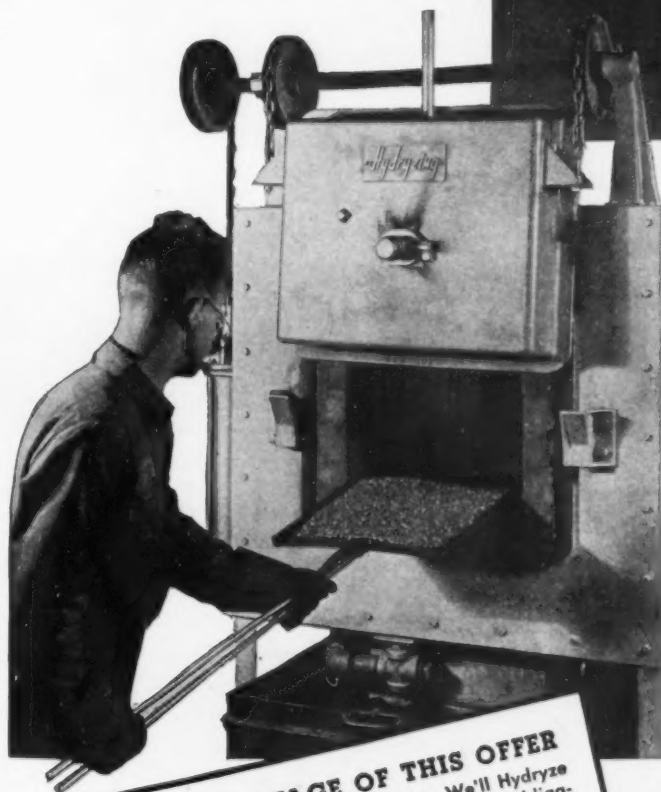
Special machinery: E. W. Bliss Co., vertical presses, \$12,100; W. E. Shipley Machinery Co., Philadelphia, \$42,793; Detroit Tap & Tool Co., Detroit, \$7,574; Greenfield Tap & Die Corp., Greenfield, Mass., \$5,731; Hanson-Whitney Machine Co., Hartford, \$4,559; Sheffield Gage Corp., Dayton, Ohio, \$1,648; Standard

**BRIGHT HARDENING
LIKE THIS ISN'T**

MAGIC..

IT'S *Hydryzing!*

If you harden springs, stampings, or other small parts here's a really simple way to improve your product and save plenty of money doing it.



TAKE ADVANTAGE OF THIS OFFER
• Send us a batch of your parts today. We'll Hydryze and return them to you promptly. There is no obligation, and you can actually see for yourself what Hydryzing will do for your own products.

Have you often wondered how you could harden your springs, stampings, and other small parts without scale or discoloration? You can, and not only harden them without scale or discoloration, but harden them absolutely bright so that their original shiny surfaces are preserved intact.

Thus, you no longer need remove scale from hardened parts by means of pickling, sandblasting or other cleaning operations. Hydryzed parts look better because of their smooth, shiny surfaces, and take a smoother plating job because there are no pits due to scaling or subsequent cleaning operations. We'll be glad to Hydryze a batch of your parts to demonstrate the many savings possibilities of Hydryzing.

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LINDBERG FURNACES

HYDRYZING FOR HARDENING • CYCLONE FOR TEMPERING

Gage Co., Poughkeepsie, N. Y., \$1,535, all for gages.

Precision lathes (air corps): Niles-Bement-Pond Co., \$3,969; South Bend Lathe Works, South Bend, Ind., \$3,895; E. A. Kinsey Co., Cincinnati; Sidney Machine Tool Co., \$88,140; Wendey Machine Co., Torrington, Conn., \$3,674; Bardons & Oliver, Inc., \$3,240. Included in additional awards were the following: United Aircraft Corp., propeller assemblies, \$63,280; Wyckoff Drawn Steel Co., Pittsburgh, steel, \$86,441; Cone Automatic Machine Co., Inc., Windsor, Vt., screw machine, \$19,171.

Colt Deal With U.S. Provides Allowances

WASHINGTON — A closing agreement with the Treasury Department under which the Colt's Patent Fire Arms Mfg. Co., will be permitted to charge off as an indirect factory expense the cost of special tools, jigs, dies, fixtures and gages which the company must acquire to carry out a contract but which are useful only for the particular order involved, has been announced by Secretary of the Treasury Morgenthau. It was the first closing agreement to be executed under the Vinson-Trammell and the National Defense Acts.

It was emphatically denied that the agreement involved any tax concession but on the contrary gave the contractor nothing more than could have been received ordinarily under the provisions of the law. In other words, the only thing the manufacturer gains by such agreements is the advantage of knowing in advance what depreciation and obsolescence allowances will be permitted on plant and equipment for income-tax purposes and for purposes of calculating allowable profit under the Vinson-Trammell Act as amended last year by the National Defense Act.

The Vinson-Trammell act limited profits on aircraft or vessels for the navy to 10 per cent while the new law fixed the allowable profit on aircraft at 12 per cent.

The Treasury Department announcement set at rest reports that the Bureau of Internal Revenue was ready to grant tax concessions to permit manufacturers speedily to write off new plant and equipment purchases. Nevertheless, it was indicated that the Treasury recognizes that the defense contracts involve a great deal of investment and Secretary Morgenthau

called it "only fair that the contractors should know in advance what allowances will be permitted."

Price Rise Ends U.K. Steel Duties

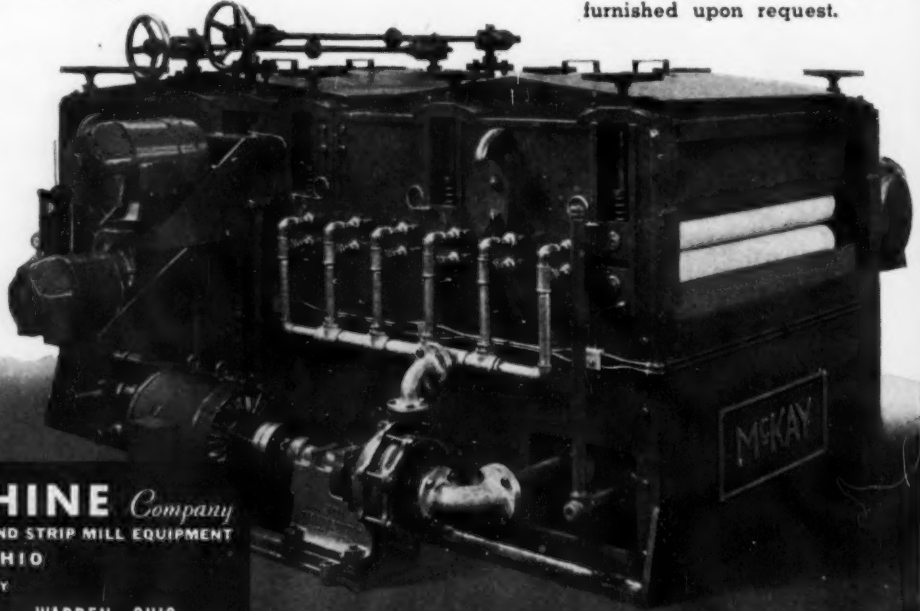
WASHINGTON — The rising price level in the principal supplying countries, now generally higher than the controlled price level in the United Kingdom, is understood to be the reason for removal by the United Kingdom of duties on imported steel, according to a cable received by the Department of Commerce from the American embassy in London. Announcement of the duty exemption order was made in THE IRON AGE of Dec. 7. The cable said the rising price level was causing the United Kingdom some difficulty in obtaining supplies to the best advantage.

"At the same time it was announced by the Board of Trade that the principal iron and steel products, including those exempted from the duty by the above order, and the principal raw materials used in the manufacture of iron

A NEW PRODUCT by McKAY for THE CLEANING of FLAT MATERIALS

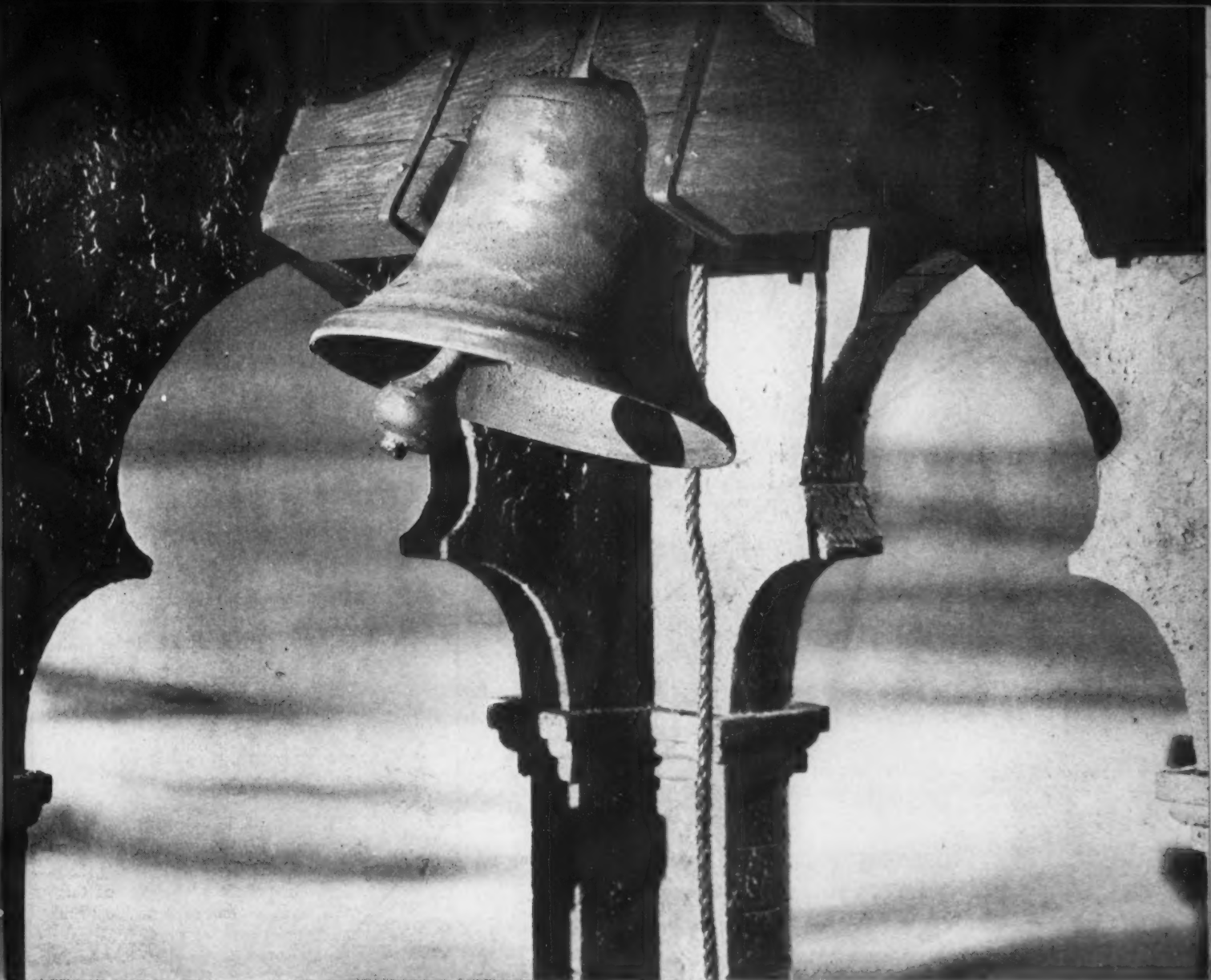
1. Uses an alkaline or a weak muriatic solution in combination with an ample supply of hot water for rinsing.
2. The most important feature in the design of the new McKay Cleaning Unit is the application of high speed rotary brushes with variable speed control resulting in more thorough cleaning of the material and longer brush life.
3. Entire brush assembly including gear motor mounted in one girder section extending the full width of the machine insures a parallel alignment and is easily adjusted and quickly removed for brush maintenance.
4. Brush shafts rotate in anti-friction bearings.
5. Compactness of design results in saving of floor space.

Full information will be gladly furnished upon request.



The McKAY MACHINE Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO
ASSOCIATED COMPANY

The WEAN ENGINEERING CO., Inc. • WARREN, OHIO



When The Armistice Is Signed

... and the flame and crash of battle are replaced by the tolling of bells, the shrieking of whistles, the roar of happy crowds... the question "What of tomorrow?" will again occupy men's minds. Once more, men will plan to adopt machines engineered for - greater - human benefits, whose use improves social and economic conditions by raising the standard of living. The Monarch Machine Tool Company, Sidney, Ohio, U. S. A.

Monarch
Lathes

and steel, including alloy steel, will almost immediately be placed on the list of goods requiring import licenses, such licenses to be issued on the recommendation of the iron and steel control of the Ministry of Supply," the Department of Commerce report said.

The United Kingdom Board of Trade duty-exemption order, announced on Dec. 5, covers the principal iron and steel products subject to import quota since 1936 and dutiable at 10 per cent instead of the varying rates

of 20 to 33 1/3 per cent applicable to goods in excess of the quota.

The main categories of iron and steel products which become subject to free entry, are: pig iron not already duty free; ingots; blooms, billets, and slabs; girders, beams, joists, and pillars, whether fabricated or not; angles, shapes, and sections, whether fabricated or not; colliery arches and pit props; bars and rods; plates and sheets; hoop and strip not already duty free; railway and tramway rails; wire

(including barbed wire) and wire cable and rope; upholstery and mattress wire springs; and screws for wood, whether coated or plated or not.

Steel Officials Get 3.8c. of Payroll Dollar

OFFICIALS of companies in the steel industry in 1937 received 3.8c. out of each dollar of payrolls disbursed to employees of the industry, the American Iron and Steel Institute has determined from data published by the Federal Census of Manufactures and the U. S. Treasury Department, covering the period 1929-1937. Between 1929 and 1937 the officials' share of steel industry payrolls dropped nearly 50 per cent. In 1929, steel company officials received nearly 7 cents of each payroll dollar.

Jones & Laughlin to Move Its New York Office

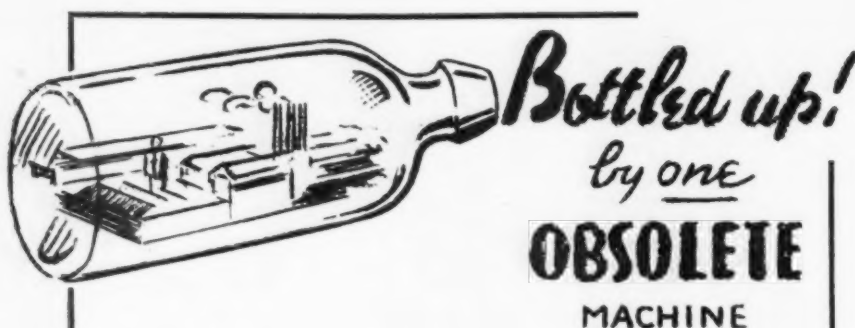
THE Jones & Laughlin Steel Corp. will move its New York office to the New York Central Building, 230 Park Avenue, before the end of this month. Its office has been at 500 Fifth Avenue for some years.

Scrap Men to Consider Uniform Trade Contracts

AT the annual convention of the Institute of Scrap Iron and Steel Inc., at Pittsburgh, Jan. 9-11, a proposed uniform contract for the scrap trade and codification of trade customs and terms will be submitted by Benjamin Schwartz, formerly director general of the institute and now a vice-president of the Schiavone-Bonomo Corp., Jersey City, N. J.

American Car & Foundry Backlog Gains Tenfold

AMERICAN CAR & FOUNDRY CO., 30 Church Street, New York, reports as of Oct. 31, 1939, a backlog of orders valued at \$32,600,000, including more than 7000 railway cars and 329 light military tanks for the Government. The company's backlog on May 1, 1939, was approximately \$2,500,000.



One piece of obsolete equipment in your plant may be frustrating plans for better production and lower costs. Progressive industries that have constantly replaced old and costly machinery are profiting in today's rush to fill orders promptly.

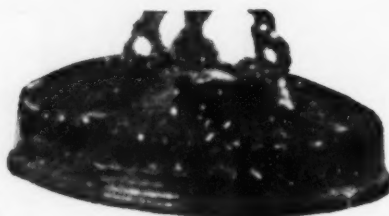


Install the NEW

For a more efficient and economical job, whether on protection, separation, concentration or purification, use STEARNS new and improved circular or rectangular magnets or other types of separators.

Perhaps your magnetic separating equipment needs checking up. What was satisfactory when originally installed may not have been kept up with added manufacturing facilities around it. Improved, modern STEARNS separators with their increased capacities may be the answer to your problem.

STEARNS engineers can give you valuable assistance in modernizing your magnetic equipment. Low maintenance expense, low initial cost, dependability and long operating life should interest you as a definitely profitable manufacturing investment.



Throw out the OLD

Write for our Bulletin 25-A on Circular and Rectangular Magnets.

SEPARATORS — DRUMS — ROLLS
CLUTCHES — BRAKES — MAGNETS

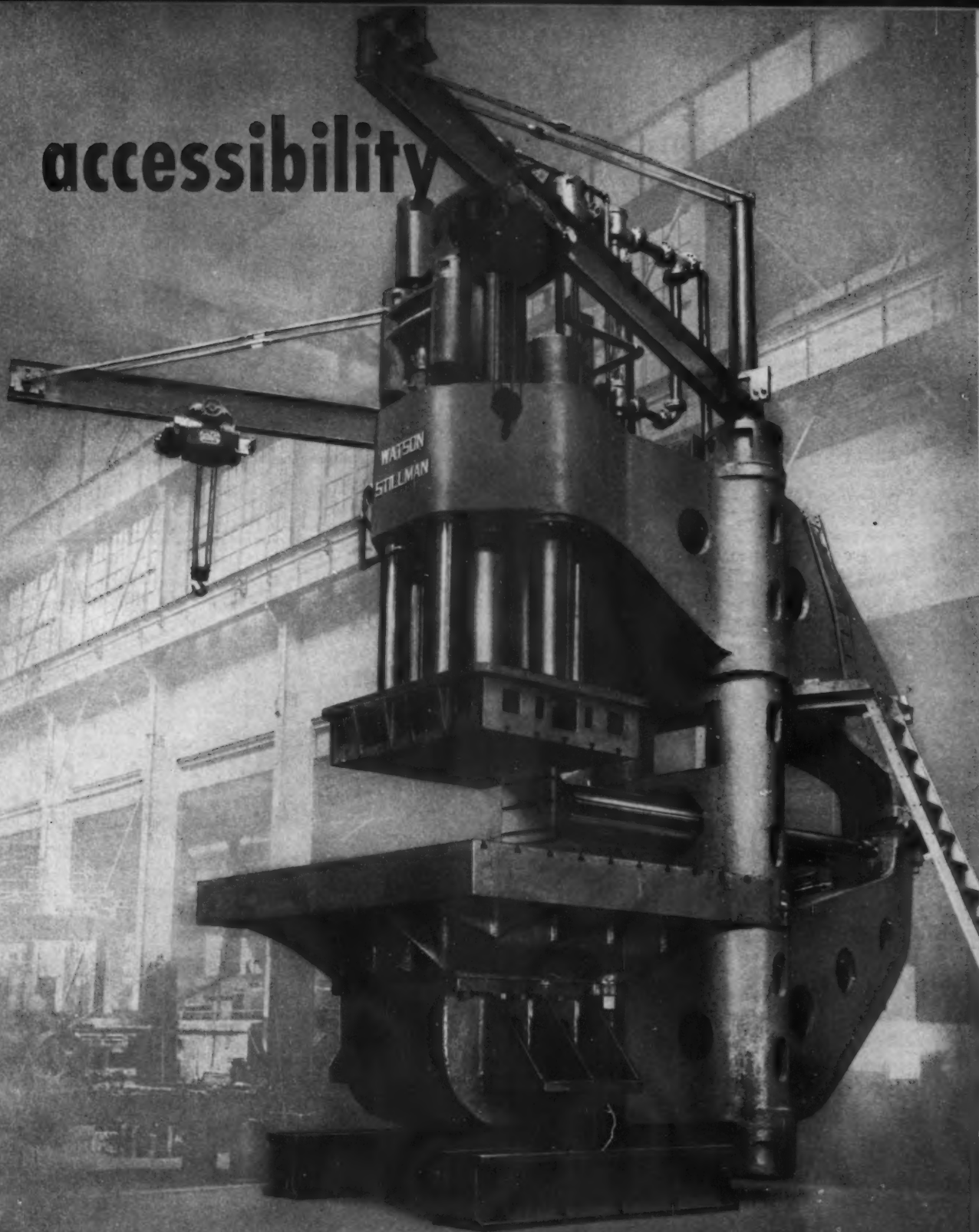
STEARNS

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work accessibility



■ Read the interesting specifications of this unique 1,500 metric ton capacity mammoth . . . a "work accessibility" problem solved by W-S engineers.

Important to solve it—because four of these presses of various sizes had to travel thousands of miles overseas . . . and had to stand on their own! (Four more are under construction on repeat orders.)

Sometimes our presses—both the globe travelers and the stay-at-homes—are built to W-S standard specifications. Just as often, customers leave the design (which may be quite special) to W-S engineering inventiveness and long experience in devising hydraulic presses of all types to meet Industry's progressive needs.

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WATSON-STILLMAN

BRIEFLY . . . a W-S Hydraulic Flanging Press—Overhung Gap Type—1,500 metric ton capacity rating. Three single-acting moving-down main cylinders—one of 1,000 m.t. capacity, and two of 250 m.t. each—making this a press of 500, 1,000, and, 1,500 m.t. capacity. Two pullback cylinders of 51 m.t. capacity each. One horizontal double-acting cylinder of 250 m.t. capacity. Stroke: Main cylinders, 59 in.; horizontal cylinder 6 ft. 7 in. Dimensions: Moving platen 8 ft. 2 $\frac{3}{4}$ in. x 6 ft. 6 $\frac{3}{4}$ in.; bottom platen 14 ft. 9 in. x 12 ft. 5 $\frac{1}{2}$ in.; horizontal ram face 24 in. x 19 $\frac{3}{4}$ in.

Arnold Wants to Turn Force of 150 Loose on Price Head-Hunt

WASHINGTON — Thurman Arnold, chief of the Justice Department's anti-trust division, launched a new head-hunt this week, seeking alleged violators of the anti-trust laws through patent law abuses, bringing a civil suit against producers of glassware machinery and glass containers for purported abuses of the patent privilege, and proposing that the Temporary National Economic Committee be made a permanent agency for watching prices and that his division add 150 lawyers and economists to its staff to vigorously enforce the anti-trust laws at an additional cost of \$2,000,000 a year.

Mr. Arnold has been authorized by Attorney General Frank Murphy to institute a general investigation, to be conducted primarily through a grand jury proceeding in the Southern District of New York, covering the use of patents, patent pooling agreements and patent licensing agreements by which, the department contends, certain industries are controlled and dominated by one or several large companies. The department did not disclose what industries are involved but it was indicated that, in the case of several, the anti-trust division feels that arbitrary and artificially high and rigid prices have been and are currently being maintained by reason of practices which the department insists amount to control and domination of certain industries through the patent system.

No Issue With Patent Laws

A Justice Department announcement explained that the anti-trust division has no issue with the patent laws but subscribes without reservation to the patent system. But if the patent owner seeks to restrain and control trade in violation of the anti-trust laws, the department said, then it becomes the Government's responsibility legally to end such practices. It was said that the grand jury inquiry will involve every type of practice, since heretofore none of the practices now complained of by the department have ever been presented for judicial determination. Hence, the department is attempting to have such judicial determination made on all patent practices which it believes are unlawful under the anti-trust laws.

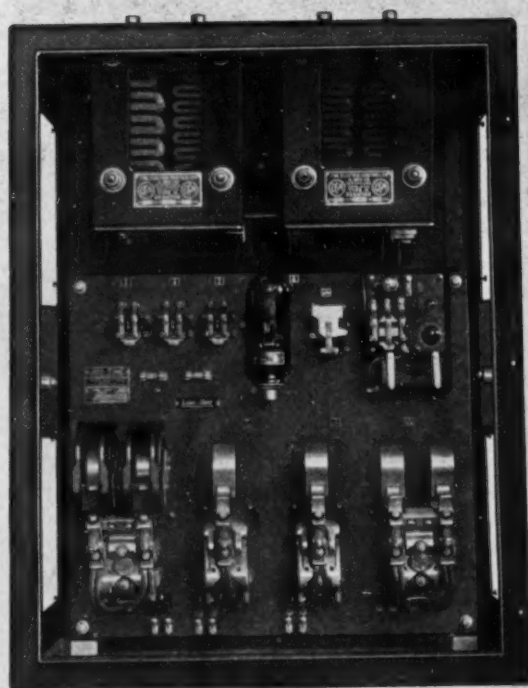
In the case of the equity suit brought against the glass container

and glass machinery manufacturers, a number of the individuals named as defendants testified before the TNEC during the course of its investigations covering the patent system. It was at that hearing, the Justice Department said, when the facts in the anti-trust action now being taken were first

made public. This was advanced as the reason why a civil suit was being instituted rather than a criminal suit.

Specifically, the complaint, filed in the Federal District Court at Toledo, charges conspiracy to restrain trade and secure a monopoly in machinery, in patents covering such machinery, and in other processes used in the glass container industry, and that as a consequence competition has been stifled, and the price of products artificially increased "contrary to the

EC & M NEO-TIME of Limited



NEO-TIME unit is mounted on upper right of this 150 HP starter-panel and has front-cover removed. Adjustment is made by simply turning a small dial. Could anything be simpler or quicker!

WHEN adding a large, electric motor-driven, rotary air compressor to this Lake Freight, it was necessary to keep current peaks at a low value during starting in order not to overburden the capacity of this ship's direct current generator.



HEAVY DUTY MOTOR CONTROL
FOR CRANES, MILL DRIVES AND
MACHINERY • BRAKES • LIMIT
STOPS • LIFTING MAGNETS AND
AUTOMATIC WELD TIMERS

To meet this requirement, the ship owners selected an EC&M NEO-TIME Motor Starter of heavy duty design for the 150 HP, 230 Volt compressor motor. Long-time acceleration on the starting resistors is provided by EC&M NEO-TIME Control—a simple, flexible, definite-time system, easily adjustable over a wide range, from a few seconds up to several minutes per step as required.

purposes of the patent law to promote science and the useful arts."

Field Squad of 50 Planned

Mr. Arnold's plan to give the TNEC new status amounts virtually to making it a quasi-arm of the Justice Department's anti-trust division without the necessity of new legislation provided sufficient funds and personnel are made available. The idea advocated by the anti-trust division head revolves around his proposal to send

50 men into the field "to head up the investigation of consumers' complaints and promote cooperation with consumer groups." To be lawyer-economists, they would act as clearing houses for complaints from consumers and business men.

In addition, 100 men to assist the smaller groups of state supervisors would be employed, under Mr. Arnold's proposal, and the TNEC, with new permanent status, would be "the proper tribunal" before which to

present matters where hearings are sought not strictly pertaining to law violations or where it might be considered desirable to consider amendment of the present laws to deal with particular industrial problems." The anti-trust division chieftain also proposed the establishment of a bureau of industrial economics "to furnish an objective survey of the facts of any industry for the benefit of the agencies which deal with the anti-trust laws."

"The total annual appropriation for all these activities for the anti-trust division and the TNEC as a permanent body would not exceed \$2,000,000," Mr. Arnold said. "That sum, of course, is in addition to the present appropriation allocated to the anti-trust division. We are about to spend nearly a billion dollars a year on armaments alone. The type of organization outlined herein would permit effective control within reasonable limits of prices and save millions annually to consumers."

No Drastic Law Likely

Mr. Arnold advanced his proposals as the TNEC brought the hearings on its general price investigation to a close. He conceded that "no drastic and far-reaching price legislation is within the realm of possibility today" and added that "there has been no evidence submitted that any drastic long-term plan for regulation in this field would receive any substantial public support." Mr. Arnold told the committee that even "the planners themselves are not in agreement."

"One thing stands out as a result of these hearings which should be accepted as a political fact," the Assistant Attorney General said in summarizing. "It is that the American people believe in a competitive system based on maximum opportunity for free enterprise, and that they think such a system can be maintained under present laws without fundamental change. They demand an organization which can make present laws effective. Therefore, I propose . . . an immediate practical plan of organization to attack the problem of price rigidity by freeing competitive forces. It is a program which could be started in a week's time without further legislation, provided sufficient funds and personnel were available."

Fray Machine Tool Co., 515 West Windsor Road, Glendale, Cal., announces that hereafter it will deal directly with jobbers, distributors, dealers and users of its products and has severed its connection with former representatives.

Starter meets requirements Generator Capacity . . .



Photo-Courtesy "Pit & Quarry"

The starter is shown with front-door and screwed-on side-plates removed; starting resistors being mounted in the top of the enclosing cabinet. This provides a compact, self-contained, easily installed unit.

EC&M NEO-TIME Control is a sturdy, flexible system of control for successfully solving . . . acceleration problems . . . industrial timing problems. Put your requirements up to EC&M NEO-TIME Control.

Cut Production Costs *with*



Careycel Insulation
For temperatures up to
300° F.



85% Magnesia
For High and Medium
Pressure.



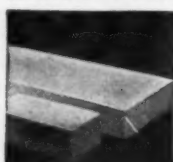
Combination Hi-Temp—
85% Magnesia.

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Modern industrial plants are saving thousands of fuel dollars each year through the correct application of CAREY Heat Insulations . . . a complete line of high efficiency insulating materials of Asbestos and Magnesia for every known service condition—for temperatures ranging from

SUB-ZERO to 2500° F.

Put your special problems up to Carey Engineers . . . their experience and Carey research



Hi-Temp Blocks
For Furnaces, Ovens,
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Hair Felt Insulation
For sub-zero tempera-
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facilities are available through branch offices covering the nation. Write for book of interesting, technical data.

THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
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MORE TONS PER HOUR **WITH TOWMOTOR CLEVELAND TOWMOTORS**



Faster handling with speedy, versatile, TOWMOTOR Lift Trucks. Equipped with fork, ram, flat plate or scoop, they unload and load cars and trucks, carry and stack coils of wire or strip, bundles of sheet or tin plate, pipe, parts in process and bulk materials in loads up to 8000 lbs. They are gas powered for speed, economy and 24 hour, uninterrupted service. Seated center control for safety and visibility. Get the facts on TOWMOTOR economy. Write for action picture bulletin today.

TOWMOTOR CO., 1231 E. 152ND ST., CLEVELAND, OHIO
SALES OFFICES IN 22 PRINCIPAL CITIES

This Week on the Assembly Line

(CONTINUED FROM PAGE 59)

Machine Co.; Williams S. Knudsen, president, General Motors Corp.; Bryson D. Horton, brother of Mrs. Rackham; J. W. Parker, ESD president; and J. H. Hunt, GM engineer and former ESD president. Alfred C. Marshall, vice-president and general manager of Detroit Edison Co., is treasurer, and Douglas Dow is secretary.

Stringent Ban on Strikes

A stringent strike ban, announced last week by the UAW-CIO at its executive board meeting in Pittsburgh, fits in with a trend established in the recent past. First warning note was sounded less than six weeks ago when R. J. Thomas, UAW president, George F. Addes, secretary-treasurer, and Walter P. Reuther, GM director for the union, issued a signed warning to wildcat strikers at the Oakland, Cal., Chevrolet truck plant. Then, they said that unionists who cause unauthorized strikes would "not be tolerated." Next came the Chrysler contract with its restrictions against strikes and a significant paragraph which said that any strike, legal or illegal, would kill the contract. Another contract recently signed with Murray Corp. reserves to the company the right to discipline any employees proved guilty of stopping work in violation of terms of the contract.

The latest CIO regulation is the strongest ever issued by the organization. It consists of instructions to UAW-CIO locals by the International officers to support the temporary substitution of other workers for unionists who cause unauthorized strikes threatening a general shutdown of the plant. The executive board approved this regulation and added that no strike votes are to be taken by local unions in plants covered by grievance procedure contracts until all steps in the procedure have been exhausted. Locals are expected to obtain approval of international officers before taking strike votes.

The Pittsburgh meeting brought the revelation that the CIO is at least a little nettled by Homer Martin's UAW-AFL activities in outlying plants. An organizing campaign to drive Martin's support out of these plants is planned for the near future. Martin's strength in certain GM plants far from the Detroit headquarters has never been successfully disputed.

Tool and Die Shops Come Under Wages and Hours Act

Tool and die shops are affected by a new interpretation of the Wages and

Hours Act. Previous interpretation said that tool and die shops supplying local companies only were not engaged in interstate commerce and were not subject to provisions of the act. The exemption was given on the basis that dies, for instance, are worn out on the job and no part of the die moves into the product in interstate commerce. The reversal of opinion by the Department of Labor will affect many small shops which have been operating approximately 44 hr. a week.

Meanwhile, tool and die contracts with the CIO expire at the end of the year. Negotiations, which have not started yet, probably will result in some fireworks. Manufacturers feel that the UAW did a lot to embarrass them when union men refused to work on tools or dies for General Motors during the strike last spring. The UAW was on strike in General Motors plants, but not in the independent shops, yet its action made the independent shops parties to a boycott against General Motors against their will. In addition, the UAW then forced into the General Motors contract an agreement that more of the corporation's die work would be done in corporation shops, thus tending to deprive the independents of their means of livelihood. This will be a point at issue in contract negotiations.

Briggs is abandoning the long "K" building which it rented from Ford Motor Co. at Highland Park. Sedan bodies are no longer made there; conveyors and equipment are being pulled out and sold for scrap. Ford, it is reported, will move 5000 men into this building to work on seats and interior trim panels.

Anglo-French Purchasing Board Set Up in New York

A JOINT purchasing board has been set up by the British and French buying missions in the United States, although the two groups will maintain separate offices. Arthur B. Purvis, general director of the British Commission, becomes chairman of the newly formed Anglo-French Purchasing Board in the United States. His offices remain at 25 Broadway, New York. J. Frederic Bloch-bainé, head of the French group, is vice-chairman of the Anglo-French board. In order to be near the British group, the French Purchasing Commission has moved in the past week from 610 Fifth Avenue to 15 Broad Street, New York. The telephone number of the French mission is Whitehall 4-7900.



ON EVERY CARLOAD HANDLED

That's *real* economy—the kind of economy that YALE Electric Trucks make possible for the Ball Brothers Company of Muncie, Indiana.

Before installing their YALE Electric Tilting Fork Truck, it took 8 men 4 hours to unload one carload of zinc. Today, the same job is done by one man in two and one-half hours! In addition, the possibility of accidental injury to workmen has been practically eliminated and the busy railroad switch is kept constantly clear for other traffic.

Say Ball Brothers:

"The first of our nine YALE Electric Trucks, purchased more than 12 years ago, still are in daily use and giving highly satisfactory service. YALE standardization of parts permits keeping our older trucks thoroughly modern and up-to-date. We consider the maintenance requirement very low. We feel that the demonstrated dependability and long life of our YALE trucks justifies the confidence we have placed in your equipment."

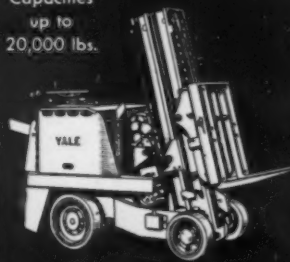
YALE *always* justifies the industrial confidence placed in their equipment—because YALE Electric Trucks always deliver the goods! Just as modern YALE methods helped Ball Brothers solve a particular handling problem—they can help YOU.

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30,000 lbs.



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up to
20,000 lbs.



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Rapid Routine Examination For Microstructure Control

THE theory that rapid routine microscopic examination of the structure of iron in cylinder bores would be an advantage in controlling microstructure and would supplement and confirm present tests was advanced by E. K. Smith, metallurgist, Electro Metallurgical Co., at the December meeting of the Detroit chap-

ters of the Society of Automotive Engineers and the American Foundrymen's Association. Mr. Smith appeared on the program with Paul Lane, research engineer, American Hammered Piston Ring Division, Koppers Co.

Mr. Smith limited his observations to microstructure, composition, hard-

ness and wear of cast iron cylinder bores, while Mr. Lane dealt specifically with engine wear and its relation to microstructure and hardness.

The Smith investigation produced strong evidence that the ferrite-fine graphite structure is associated with excessive wear in cylinder bores. Part of the control of this condition, he suggested, is that the engineer and designer should design cast iron sections so the cooling rate will automatically produce a structure which will be free from ferrite-fine graphite.

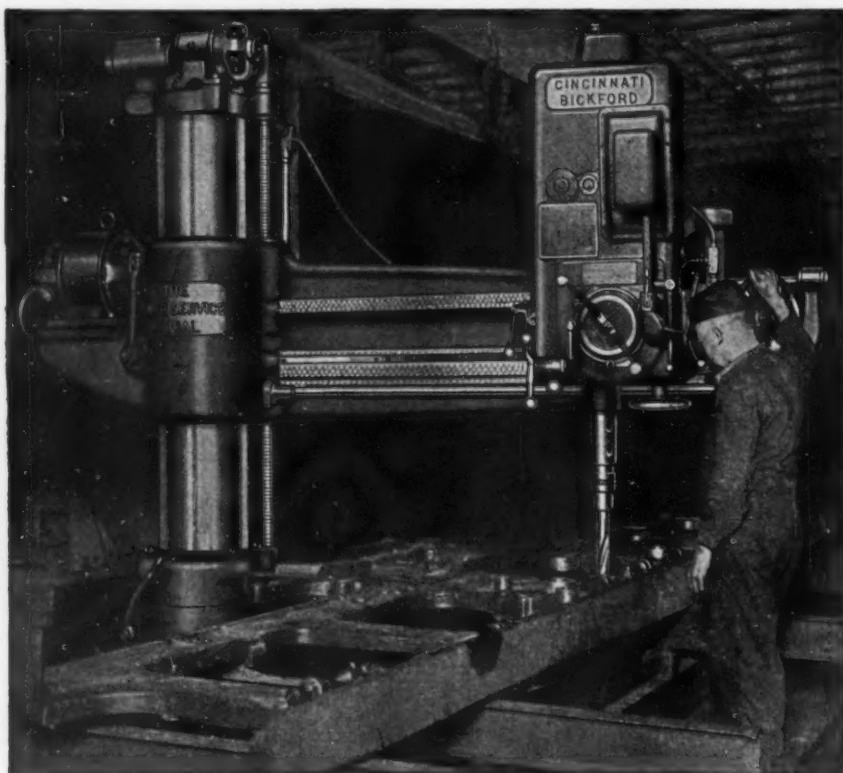
In the second place, the speaker suggested that the foundryman is able to modify the structure of his iron to considerable extent by his methods for gating and pouring the castings. He also suggested metallurgical control of cast iron structures by the choice of mixtures and use of suitable alloys. In many cases the ferrite-fine graphite structure can be completely eliminated by the addition of ferrosilicon or silicon-manganese, or one of the other graphitizers in the ladle. He said that ladle addition of balanced alloys containing chromium and various graphitizers are giving very promising results and several combinations of molybdenum-chromium and nickel-chromium are being successfully used.

The speaker revealed that very recent research work in England has shown that certain alloys, particularly chromium, molybdenum and tungsten increase the thermal conductivity of cast iron.

Mr. Smith came to the conclusion that the best cylinder bore structure, considering machinability, cost, and especially resistance to wear, consists of an entirely pearlitic matrix with long thin flakes of normal graphite, no ferrite, and sufficient small particles of iron-chrome carbide to increase resistance to wear.

Examination of unmachined bore surfaces of several cylinders revealed in several cases a continuous line of ferrite on the surface of the casting. The speaker warned that in order to avoid a very soft bore wall, it is necessary to machine completely through this ferritic rim and suggested that this surface phenomenon is another argument for the use of the microscope in the foundry. The presence of ferrite was indicated in his talk as an important factor in bore wear.

While it has long been a consideration that Brinell hardness offered a direct measure of resistance to wear in motor blocks, samples investigated did not indicate any such direct relation. It would appear, Mr. Smith said, that the actual structure has an



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THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

important relation to the wear of the cylinder, and that the Brinell hardness is of importance in enabling the foundryman to control the structure as well as being a control of machinability.

Fifty Microphotographs

The Smith paper was illustrated with some 50 microphotographs prepared by his wife, Rebecca Hall Smith.

In his complementary paper, Mr. Lane agreed that hardness has not proved to be a reliable indicator of wear resistance. Nor do tensile strength or other physical properties give a very good indication of wear resistant qualities, Mr. Lane declared. This, he said, is shown by the fact that hard rubber, bakelite and soft carbon will rapidly destroy the extremely hard edge of tool steels in machining these softer materials. Also, he pointed out, it is quite common to find that soft packing, fibre washers or babbitt metal will wear steel shafts against which they operate, although the steel shafts have far higher physical properties.

British Recover 45,000 Tons Of Scrap From Dumps

LONDON—About 45,000 tons of scrap iron and steel, which would otherwise have been left to rust, has been dispatched to British steel mills in the first three weeks of the nationwide appeal organized by the Iron and Steel Control. This is equivalent to approximately eight full cargoes, and it means so much less risk to vessels required for other purposes.

U. S. Awards Contract For Turkish Chrome Ore

WASHINGTON—The Treasury Department last Friday awarded a contract for 20,000 long tons of Turkish chrome ore (48 per cent chromium oxide) to the Mutual Chemical Co., New York, at \$26.50 per long ton unit, c.i.f., Philadelphia. The Mutual Chemical Co. is the United States agent for the "Eti" bank, export representative of the Turkish government.


Britain to Sell Sheets Again in Export Trade

LONDON—The announcement of revised export prices has aroused considerable interest in the British

steel sheet trade. For months the British sheet mills have been concentrating upon the production of sheets for air raid shelters and it has been extremely difficult to obtain any material for export, or, indeed, for the home trade apart from Government requirements.

The announcement is interpreted by the market as meaning that the pressure of Government work has relaxed sufficiently to enable export business to be resumed on a limited scale in the

near future. The new prices raise the quotation for 24-gage galvanized corrugated sheets to £18. 2s. 6d., f.o.b., and for black sheets to £15. 12s. 6d., f.o.b. These are fixed prices for the British Empire markets and mandated territories, but for any other overseas markets, apart from the Irish Free State, they may be regarded as minimum quotations. The basis quotation for the Irish Free State for galvanized sheets is £18. 2s. 6d., f.o.q., and for black sheets £16. 2s. 6d., f.o.q.




KROKOLOY—Chrome cobalt alloy castings for super-high production. Air-hardening.

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Our Flamaloy—a thoroughly practical, easily handled, flame-hardening steel—is extensively used for punches, pads and inserts in large pressed metal dies. For these applications its lesser alloy, combined with good physical properties and wear-resistance, is unusually desirable.

Flamaloy castings are machined in the annealed state, after which the areas or surfaces to be hardened may be heated with a torch and water-quenched for an approximate 600 to 620 Brinell. Draw beads or joint lines are easily built up by welding.

In addition to these steels in our regular line, we will gladly quote on any special analysis you may require.

DETROIT ALLOY STEEL COMPANY

Foot of Iron Street  Detroit, Michigan

... THE NEWS IN BRIEF ...

Automobile production jumped to 115,488 last week and a near-record is now seen likely for the fourth quarter.—Page 56.

Steel inventories not excessive, steel industry's attitude has been to adhere to base prices, Studebaker chairman tells TNEC.—Page 62.

WPA analyzes statutes responsible for impeding free flow of commerce between states.—Page 64.

Iron and steel contracts placed by Government in week ended Dec. 2 total \$827,121.—Page 66.

War Department contracts for two weeks total \$8,680,587.—Page 66.

Government agreement with Colt company on firearm manufacture includes provision for depreciation, obsolescence.—Page 68.

Rising price level in supplying countries reasons for removal of United Kingdom duties on steel imports.—Page 68.

Institute of Iron and Steel Scrap to study uniform trade contracts and codification of trade terms.—Page 70.

Officials of companies in steel industry receive 3.8c. of each dollar of payroll.—Page 70.

American Car & Foundry Co. reports tenfold gain in order backlog to \$32,600,000.—Page 70.

Jones & Laughlin to move its New York office.—Page 70.

Thurman Arnold launches new head hunt, wants new force of 150 to watch prices.—Page 72.

Anglo-French Purchasing Board set up in New York.—Page 75.

Rapid routine examination for micro-structure control would be advantageous, Detroit chapter of S.A.E. is told.—Page 76.

U. S. awards contract for Turkish chrome ore.—Page 77.

British recover 45,000 tons of scrap from dumps.—Page 77.

Britain to sell sheets again in export trade.—Page 77.

Second Gray Iron Cost Clinic is held at Chicago.—Page 80.

Heavy construction awards in November total \$302,215,000, or 11 per cent above like month of 1938.—Page 80.

Three companies pay Christmas bonuses.—Page 80.

Armour Institute builds experimental foundry to advance method of counter-gravity die-casting of iron or other metals.—Page 81.

British contraband control active.—Page 81.

Dr. Oliver E. Buckley elected chairman of the Engineering Foundation.—Page 81.

Three firms build new plants or expand old ones on contracts given Austin Co.—Page 86.

Output of Canadian metal-working plants in 1938 valued at \$550,493,894.—Page 86C.

Construction work expanding in Canada.—Page 86C.

Canadian mills booking in 1940.—Page 86C.

Orders placed by Canadian War Supply Board now total \$48,000,000. ... Some munitions orders placed.—Page 86C.

British Columbia shipyards expect orders from Canadian Government for sub-chasers.—Page 86C.

Talk of steel plant in Western Canada is revived.—Page 86D.

Fritz J. Frank, president of the Iron Age Publishing Co., died on Dec. 8, at the Northern Westchester Hospital, Mt. Kisco, N. Y.—Page 87.

Iron and steel exports gained only slightly in October.—Page 88.

All-time high production record of 5,462,616 gross tons of ingots attained in November.—Page 89.

Domestic ordering of machine tools is on a somewhat lower level in most districts reporting, making for greater disparity between domestic and foreign volume. ... Warner & Swasey salesmen see good first quarter.—Page 110.

Russian iron and steel output declines.—Page 110.

Congress of American Industry urges removal of unreasonable curbs on business, asks reduced spending, adopts program for recovery.

Manufacturers' inventories still below normal, a National Industrial Conference Board survey shows.

For the first time the Labor Board has ordered Ford Motor Co. to recognize the UAW.

William M. Leiserson tried to clean up irregularities in the Labor Board, his testimony before house committee shows.

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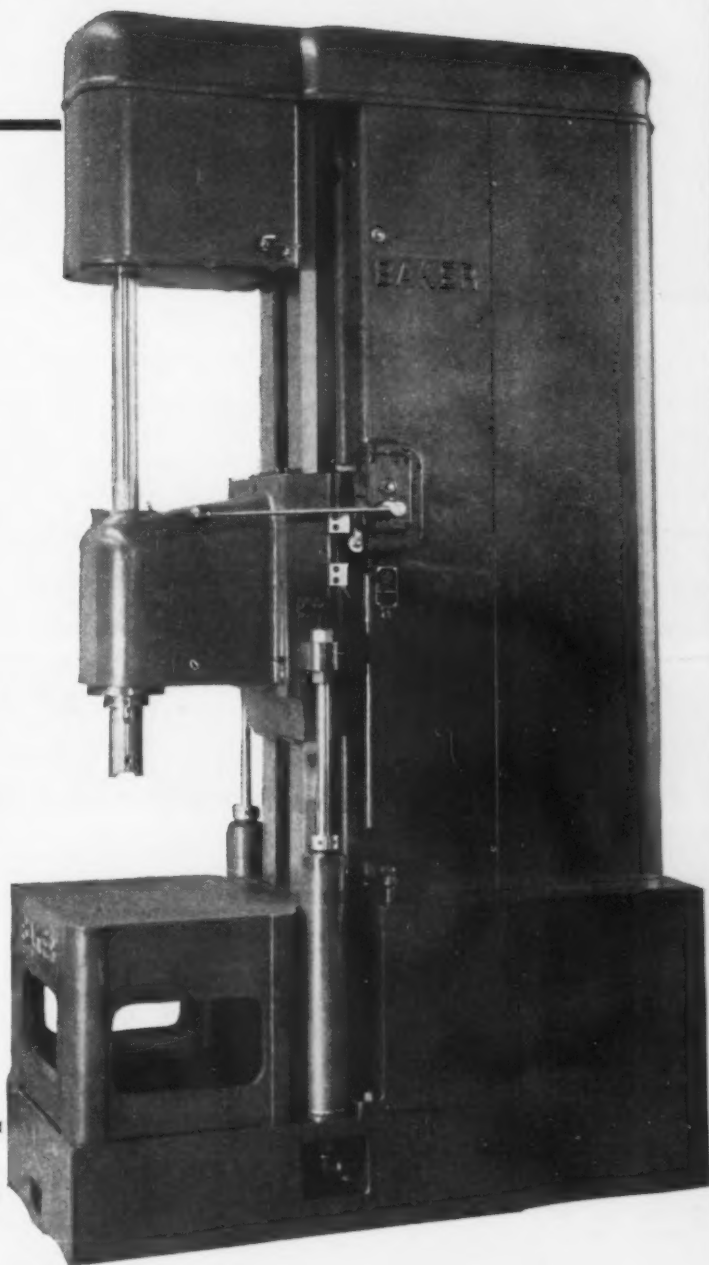
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November Building Awards 11 Per Cent Over 1938

HEAVY construction awards placed in November amounted to \$302,215,000, or an average of \$60,443,000 per week. This represents a gain of 11 per cent over the weekly average for November, 1938, but is 1 per cent below the October, 1939, average, according to *Engineering News-Record*.

Private awards in November, totaling \$111,632,000, were, on a weekly average basis, 95 per cent over the corresponding month of 1938 and 11 per cent below the October, 1939, level. November public construction awards, amounting to \$190,583,000, were 11 per cent below a year ago, but 11 per cent above a month ago.

The value of construction awards placed in the first 10 months of 1939 is \$2,812,529,000, or 12.3 per cent above the corresponding period of 1938. Private awards for the year to date are running 10 per cent above a year ago and public construction 14 per cent higher.

The New England and the Middle* Atlantic districts reported the largest gain in the month.

Gray Iron Foundry Cost Clinic

ON Dec. 5, the second Gray Iron Cost Clinic was held at the Bismarck Hotel in Chicago. The clinic covered "Distribution of Foundry Expense Items" and also the "Cost of Melted Metal." A unique method of handling the cost of melted metal has been evolved and the variations in the component parts has prompted studies on the part of several individuals to determine why some items should be excessive. The interest centered on materials, labor, and supplies. The "Molding Department" has been selected as the subject of discussion for the next meeting which will be held in the same place on Jan. 16, 1940.

Three Companies Pay Christmas Bonuses

BOSTON—Among companies paying Christmas bonuses are American Hardware Corp., New Britain, Conn., 5 per cent of earnings for third quarter to 4800 employees. Bristol Brass Corp., Bristol, Conn., employed one year or more, one week's pay; employed six months or less, half a week's pay; all others \$5 each to 400 employees. L. S. Starrett Co., Athol, Mass., based on length of service, 4 to 10 per cent of earnings of last six months to 500 employees.

Experimental Foundry Planned at Chicago

CHICAGO—The Research Foundation of Armour Institute of Technology has completed the foundations for an experimental foundry to be used primarily for the purpose of advancing the method of counter-gravity die-casting of iron and other high melting metals.

This process to be studied by the foundation consists of forcing the molten metal by air through a refractory tube into the mold which is located over the crucible. According to Armour the new method is far superior to the gravity flow sand mold practice now in universal use. The tensile strength of a gray iron casting obtained by the new method is said to be about 40,000 lb. a sq. in., compared with 25,000 lb. obtained by the old process. Finer grain and smoother surface are other claimed advantages.

The new foundry, which was made possible by the Wetherill Research Fund, established recently by Col. S. P. Wetherill of Philadelphia, will be completely equipped with all foundry facilities. Construction is well under-way.

British Contraband Control Active

LONDON—The British Contraband Control announces that it has now detained a total of 441,000 tons of suspected contraband goods during the first 11 weeks of the war. The latest list of such goods detained includes 1100 tons of ores and metals.

Engineering Foundation Elects

DR. OLIVER E. BUCKLEY, executive vice-president, Bell Telephone Laboratories, New York, has been elected chairman of the Engineering Foundation, research organization of the national engineering societies. F. F. Colcord, vice-president, U. S. Smelting, Refining & Mining Co., was chosen vice-chairman. Kenneth A. Condit, Princeton University, was elected chairman of the foundation's research procedure committee, to which E. M. T. Ryder, engineer, Third Avenue Railway System, New York, was also named. Prof. Walter I. Slichter, Columbia University, becomes a member of the executive committee.

Tubular Service Corp., New York, has leased space from the Bissett Steel Co. for a steel tubing warehouse at 945 East 67th Street, Cleveland.

Have You a Hot Rolling Problem?

Where careful metallurgical control and skilled work is required on ferrous and non-ferrous alloys—our services can be of real value to you.

We are expertly equipped to hot roll any metal into bars, rods and flats on a contract or toll basis.

We can handle ingots or billets up to about 6" x 6" and hot roll to as small as 1/4" diameter in coils. Also a wide variety of square and flat sizes.

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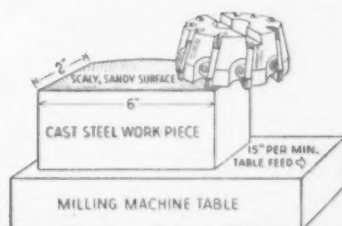
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Melters and Manufacturers of "TOPHET" Resistance Wires—
Nickel Chrome Alloys—Copper Nickel Alloys—Pure Nickel
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The Bright Spot IN MILLING SCALY STEEL CASTINGS

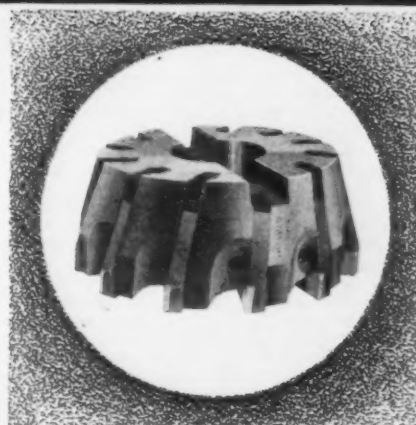
KENNAMETAL MACHINES . . .
15 TO 30 TIMES MORE PIECES
IN 1/6 THE TIME PER PIECE



Cutter used on above job was a 5 in. diam., ten blade, McCrosky Jack-Lock Milling Cutter, similar to their twelve blade cutter illustrated at right. Photo courtesy McCrosky Tool Corp., Meadville, Pa.

Type of Blade	Pieces per Grind	Milling Time per Piece
KENNAMETAL-tipped	300	Less than 1/2 min.
High Speed Steel	10 to 20	3 minutes

The above tests were made on steel as cast; that is, without previous removal of sand or scale. This is an unusually severe test for a hard carbide material, yet there was no breakage of the KENNAMETAL-tipped blades. KENNAMETAL is harder than the hardest tool steel, but stronger than other carbides of same hardness range . . . assuring outstanding performance over a long period of tool life.



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What's New in Cleaning and Finishing Equipment for Metal Products

(CONTINUED FROM PAGE 55)

ing the rectifier to electroplating, separate units can be used for each electroplating tank in place of a large unit serving several tanks, as is customary with generating equipment. Approximately full-load efficiency can be maintained at all times because rectifiers can be shut down on any tank not being used. Furthermore, each

rectifier can be adjusted to the voltage required by its particular tank, thus eliminating the use of a tank rheostat with its inherent losses.

The rectifiers are built up from standard sectional units with an output capacity of 1.8 kw. each. Two d.c. ratings are available, in 6 and 12 volts. The standard 6-volt sectional

unit is rated 300 amp., and the 12-volt at 150 amp. By paralleling two or more sections any desired current capacity can be obtained.

A G-E hand-operated voltage regulator, illustrated, for use with these rectifiers, provides a simple means of adjusting the voltage output of the rectifier at the tank. Several sizes are available, so that from one to seven parallel rectifier units can be controlled simultaneously from one regulator.

Entrainment Separator for Air Borne Liquids

EFFECTIVE removal of atomized or entrained liquids in ventilating systems arising from washing, pickling and plating processes or from spray booths, is claimed for an entrainment separator designed by the *Claude B. Schneible Co.*, 3951 W. Lawrence Avenue, Chicago. Exhaust air with its burden of liquid is passed through an impingement unit, consisting of a multiplicity of stationary curved vanes vertically imposed upon a shelf with a central opening and with a conical roof section on top of the vanes, as shown. Air or gas entering the unit is rotated, separating the larger liquid particles, and then passes through the turbine-like vanes to increase the centrifugal action and impingement growth of minute liquid particles. Separated liquid drips down into a hopper at the bottom of the unit, from where it is drawn off for reuse or disposal. Means are also provided for flushing the unit occasionally and separate means are available for recovering the flushing fluid. From a plant maintenance point of view, this separator is useful in preventing acid, alkali or oil bearing entrainment from getting on the roof and other property.

Paint Stripper

AFCO 231 is the name given a new type of cold process stripper for removal of lacquers, synthetic enamels and paints from metals, recently introduced by the *Fergusson Laboratories*, a division of *Alex. C. Fergusson Co.*, Drexel Building, Philadelphia. It is applied cold on large pieces by sponging on with a rubber sponge or steel wool. Smaller pieces may be immersed in a tank of cold solution. The stripper is allowed to remain in contact with the work 10 to 15 min. and then is hosed off with warm or cold water. The surface may be recoated as soon as dry.

This material comes ready mixed for use and is applied without dilution. It is not inflammable and is said not

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Dodge Steel Co. Philadelphia, Pa.
Clark Equipment Co. Buchanan, Mich.
Gunite Foundries Rockford, Ill.
Link Belt Co. Indianapolis, Ind.
American Chain Co. York, Pa.
Andrew Terry Co. Terryville, Conn.
Auto Specialties Mfg. Co. St. Joseph, Mich.
Greenlee Brothers Co. Rockford, Ill.
National Foundry Co. Brooklyn, N. Y.
Yale & Towne Mfg. Co. Stamford, Conn.
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General Electric Co. Several places
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Otis Elevator Co. Yonkers, N. Y.
Delco-Remy Div. Anderson, Ind.
Wright Aeronautical Corp. Paterson, N. J.
Magnus Metal Div. Several places
Milwaukee Valve Co. Milwaukee, Wis.
Bohn Aluminum & Brass Corp. Detroit, Mich.
Sivyer Steel Castings Co. Milwaukee, Wis.
Chapman Valve & Mfg. Co.
..... Indian Orchard, Mass.
Nat'l Malt. & Stl. Cstgs. Co. Several places
Malleable Iron Fittings Co. Branford, Conn.

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Sacks Barlow Foundries Newark, N. J.
Walworth Co. Greensburg, Pa.
Stockham Pipe Fittings Co. Birmingham, Ala.
Belle City Malleable Iron Co. Racine, Wis.
Crane Co. Chicago, Ill.
Adirondack Steel Fdries. Watervliet, N. Y.
Bucyrus-Erie Co. S. Milwaukee, Wis.
American Steel Fdries Verona, Pa.
Michigan Steel Castings Co. Detroit, Mich.
Draper Corp. Hopedale, Mass.
American Brake Shoe & Fdry Co.
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Atlas Foundry Co. Irvington, N. J.
Liberty Foundry Co. Wauwatosa, Wis.
Cadillac Motor Car Co. Detroit, Mich.
Allis-Chalmers Mfg. Co. Several places
Cutler-Hammer Mfg. Co. Milwaukee, Wis.
Kalamazoo Stove Co. Kalamazoo, Mich.
Kelsey-Hayes Wheel Co. Detroit, Mich.
Bendix Products Corp. South Bend, Ind.
Ross-Meehan Foundries Co.
..... Chattanooga, Tenn.
Ford Motor Co. Detroit, Mich.
Buick Motor Co. Flint, Mich.
American Valve Co. Cossackie, N. Y.
Fanner Mfg. Co. Cleveland, Ohio
Woodruff & Edwards Elgin, Ill.
Forest City Foundry Co. Cleveland, Ohio
West Steel Castings Co. Cleveland, Ohio
Falk Corp. Milwaukee, Wis.

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to harden or evaporate. It works by dissolving the coating, which flows off in the hosing operation, no wiping or scraping action being necessary. Afco 231 will not attack ferrous metals, but will slightly discolor aluminum, although it is said to produce a greater adhesion for the later coat.

Low-Bake Finish

EXCELLENT film hardness, luster, build, adhesion, toughness, hiding power and color retention are claimed for a new low-bake industrial finish recently put on the market by the *Ault & Wiborg Corp.*, 75 Varick Street, New York. The finish is called Polymerin-100 and is similar to the original Polymerin speed-bake finish introduced last year, except that the curing temperature is generally about 100 deg. F. lower. It is processed by polymerization. This low-bake finish may be used in conventional ovens or it can be cured with force-dry equipment by stepping up the heat slightly. The new finish is expected to have application for finishing nearly any kind of metal product.

Another new *Ault & Wiborg* product is Polmeroid, made with a Polymerin base and especially formulated to give a marproof hammered effect for use on rough or porous metals. The new finish will cover defects in the metal, such as spot weld marks and file scratches. Its heat resistance makes Polmeroid well adapted for application to boiler jackets and all types of heating appliances, while its toughness and resistance to marring make it suitable for vending machines and office equipment. Polmeroid is applied with a spray gun and while it is still wet, another coat, usually nothing but solvent, is sprayed on, causing the hammered appearance, although actually the surface is smooth.

Enamel Finish

ANEW enamel finish for use on interior surfaces subject to abrasion, such as machinery, pipe lines, fire doors, dados, pipe lines and concrete floors, has been placed on the market by *Baer Brothers*, 438 West 37th Street, New York. Known as Baertex floor and dado enamel No. 11140, it is furnished in a durable shade of battleship gray, and is said to give about 40 per cent longer wear than most paints intended for this purpose. It has a coverage of about 500 sq. ft. per gal., drying overnight to a hard, glossy finish.

FENCE-BOND is a ready-mixed aluminum paint recently announced by the *Skybryte Co.* of Cleveland for painting rusted chain-link fence without removing the rust. The base oils are of the penetrating type which creep into all joints and contact points. It is said to dry from the outside, retaining a firm elasticity and withstanding movement of the joints without chipping. This paint may be applied with brush or spray gun. The pigment is Alcoa Albron paste.

PHENOLEX No. 714 silver is the name of a new form of aluminum paint just introduced by *Claronex Products, Inc.*, 237 India Street, Brooklyn, in which the pigment is a chromium treated aluminum paste, called silver because of its appearance. It is recommended for exterior and interior use as it contains the firm's regular four to seven year, all weather vehicle. It comes packaged in 1-gal. double compartment pails with paste and vehicle separate.



Buried in Dirt is ALIVE with POWER

DEEP in dirt—literally buried in it—this Dodge-Timken type "C" Pillow Block had to be dug out to be visible—and yet—under such difficult conditions—it has been alive with power operating under heavy loads and at high speeds—with negligible maintenance in a large steel mill for six years. Regardless of assignment—Dodge-Timken Bearings deliver the maximum of horsepower hours. Their ruggedness insures steadier, more continuous production flows with low maintenance—they require no attention except infrequent lubrication. They let power in—and keep abrasive dust out. All Dodge Bearings are completely assembled, factory adjusted—pre-lubricated units—delivered ready to install—Specify Dodge.

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... when planning a new plant ... when adding a new department ... when installing new machinery ... when modernizing old equipment ... when designing new products.



There are more than 1800 types and sizes of Dodge Bearings—available for both built-in machine application and for power transmission lines.



LATEST innovation in colored plastics is the use of painted colors on the cheaper brown phenolic materials. The *Sherwin-Williams Co.* of Cleveland announces the development of Kem plastic enamel, specially formulated for finishing such plastic materials and designed to provide thorough adhesion to the hard surface of plastics. Tests show that the finish withstands severe abrasion and impact without marring or chipping. Another new enamel for plastics has richness

and depth of tone provided by opalescent particles. It is known as *Kem Bakolescent enamel*, and is also said to have excellent adhesion to most plastics. These finishes are said to produce rich colors more economically than can be obtained by molding plastics in colors.

DEVELOPMENT of an enameling clay which is the equal if not the superior of German Vallendar clay has been announced by the *Por-*

celain Enameling & Mfg. Co., Baltimore, Md. This clay, known as *Pemco micronized clay*, type M-7, is mined in North America, and is manufactured by the micronizer process in which the unrefined clay is caused to bombard itself at high speed, resulting in the explosion of the clay particles and their reduction to an average grain size of 3 microns (0.000118 in.). In the process, impurities such as iron pyrites, wood, etc., are thrown out, giving a clean clay of very fine particles.

Resin Cement for Pickling Tanks

KOREZ is a new impervious synthetic resin cement for use as an acid tight jointing material for acid proof brick employed in the construction of pickling tanks, acid neutralization and disposal equipment in the steel and allied industries. A product of the *Atlas Mineral Products Co.*, Mertztown, Pa., Korez is applied as a mortar which quickly sets by chemical action at room temperature to a dense, strong jointing material. It is impervious and inert to all acids, except the highly oxidizing ones, also to oils, water and mild alkalis at temperatures up to 330 deg. F. It is not affected by abrasion or turbulent liquids, the maker states.

Synthetic Rubber Paint

THE B. F. Goodrich Co., Akron, Ohio, announces a new synthetic elastic Koroseal paint, designated as No. 495 Korolac, the name covering solutions of the plasticized poly-vinyl chloride whose basic materials are coke, limestone and salt. A Korolac primer for use with the new paint is also introduced. The new paint gives a semi-glossy black finish and is recommended wherever extremely corrosive conditions disqualify any other kind of coating on metal.

Korolac No. 495, when thoroughly dry, will withstand all acids, alkalis and salts in the concentrations commonly met with in industry, up to temperatures of 150 deg. F.

It is not affected by plating solutions, nor are such solutions contaminated by the paint when thoroughly dried. It is extremely moisture resistant. The dried film is hard and resistant to abrasion, yet sufficiently elastic to conform to contraction and expansion of the support. Both the primer and the paint can be applied by brushing or spraying.

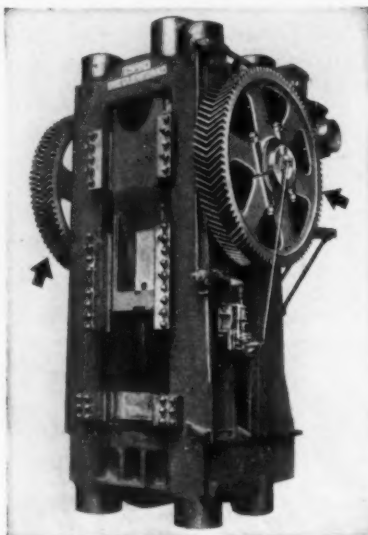
FARREL-SYKES GEARS

Strengthen the Rugged Dependability of Cleveland Power Presses

Farrel-Sykes Gears are used in Cleveland heavy duty forging-sizing presses because they provide added strength with reduced weight and size. This additional strength and high load-carrying capacity is due to the greater bearing surface provided by the continuous herringbone teeth. Precision generated by the famous Sykes process, they operate with extreme quietness and smoothness.

Wear is retarded and involute profile and correct tooth action maintained throughout the life of the gears by the combined characteristics of overlap or interlacing of the teeth, creeping engagement and inclined line of pressure. Harmful thrust loads with resultant stresses on other parts of the machinery are prevented by the opposed helices, which balance and absorb axial thrust within the gear member itself.

As a result of these and



Farrel-Sykes continuous tooth herringbone gears provide a smooth, quiet, efficient drive for these heavy duty forging-sizing presses built by the Cleveland Punch & Shear Works Company.

other advantages inherent in Farrel-Sykes gears, they can be depended upon for efficient, economical performance and long life under severe operating conditions.

When you have a gear or drive problem take advantage of the extensive experience of the Farrel organization in designing, manufacturing and operating gears and gear units for every type of service.

FARREL-SYKES GEARS
FARREL-BIRMINGHAM COMPANY, Inc.
 333 VULCAN STREET - - - - - BUFFALO, N. Y.
The Gear with a Backbone

... PIPE LINES ...

Valley Pipe Line Co., Alamo National Bank Building, San Antonio, Tex., has authorized new pressure pipe line from oil field districts in Starr County and points in Lower Rio Grande Valley area to oil refinery near McAllen, Tex., about 70 miles, for crude oil transmission. Proposed to use 4½ to 6½-in. cast iron pressure pipe. Booster pumping stations will be installed. Work will be carried out by company forces. Cost about \$125,000.

Standard Oil Co. of Ohio, Midland Building, Cleveland, has plans for new 6-in. welded steel pipe line from Dayton to Springfield, Ohio, for gasoline transmission, including new bulk terminal facilities. Cost over \$200,000, of which about \$40,000 will be expended for terminal structures.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 18 for 500 ft. of black steel pipe; also for brass pipe and pipe fittings (Circular 353); until Dec. 20 for 80 lengths of 6-in. cast iron pipe, each length 16½ ft. (Circular 360).

El Paso Natural Gas Co., Bassett Tower Building, El Paso, Tex., plans welded steel pipe line for natural gas transmission to new natural gasoline plant to be constructed near Jal. Lea County, N. M., including steel pipe line gathering system. Work will be carried out by company forces. Entire project will cost close to \$1,000,000.

Basin Pipe Line Co., Bib Spring, Tex., recently organized, has let contract to Brown & Root, Inc., Austin, Tex., and O. C. Whitaker, Fort Worth, Tex., for new 6 and 4-in. welded steel pipe line from Wasson-Denver oil field districts, Gaines and Yoakum Counties, Tex., to Big Spring, about 108 miles, for crude oil transmission to oil refinery of Cosden Oil Co., at latter place. Booster pumping stations will be installed along route. Six independent operators in oil field area will furnish crude oil for transmission from series of 10 or more wells, and steel pipe line gathering system will be built in district, with main pumping station. About 93 miles of new line will be of larger size pipe, remainder to be laterals of the smaller size. Cost about \$600,000. C. L. McIver, Fort Worth, Tex., is president of new company.

Godfrey L. Cabot, Inc., Cabot Building, Wellsville, N. Y., plans welded steel pipe lines in connection with development of new wells in natural gas fields in Allegany, Tompkins and Steuben Counties, N. Y., and Tioga and Potter Counties, Pa. Work will be carried out by company forces. Cost over \$100,000. Main offices are at 77 Franklin Street, Boston.

New York Natural Gas Corp., 123 South Cayuga Street, Ithaca, N. Y., plans steel pipe lines in conjunction with drilling of new wells in natural gas field area in Tompkins County.

Bureau of Reclamation, Denver, asks bids Dec. 18 on 2,040,000 ft. of 1-in. O.D. black steel pipe or tubing, bends and couplings for Friant Dam, Central Valley project, Cal.

CAST IRON PIPE

Cranston, R. I., has placed a tonnage of 16-in. pipe and fittings with Builders Iron Foundry, Providence, R. I.

West Hartford, Conn., has placed a tonnage of pipe with United States Pipe & Foundry Co., New York, at \$25,690. Warren Foundry & Pipe Corp. bid of \$26,357.50 was high.

Bladenboro, N. C., plans pipe line extensions in water system and other waterworks installation, including new 100,000-gal. elevated steel tank and tower. Bond issue of \$40,000 has been approved for this and extensions in sewer system.

Mahaska, Kan., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Cost about \$55,000, of which \$17,500 will represent a bond issue, to be voted at special election, Dec. 22. Paulette & Wilson, Public Utility Building, Salina, Kan., and 1005 Kansas

Avenue, Topeka, Kan., are consulting engineers.

Peninsular, Ohio, plans pipe line extensions and improvements in water system; also other waterworks installation, including elevated steel tank and tower and water-softening plant. Cost close to \$70,000. C. J. Simon, Evans Central Building, Van Wert, Ohio, is consulting engineer.

Spencer, Wis., plans pipe lines for water system and other waterworks installation. Financing in amount of \$75,000 is being arranged for this and sewer system, of which about \$35,000 will represent a bond issue.

Water Commission, Appleton, Wis., closes bids Dec. 16 for one carload of 6-in. Class 250, centrifugal cast iron pipe or equal; also for standard 6-in. fittings. A. E. Dimick, assistant secretary.

Water Bureau, Waterloo, Iowa, V. B. Trueblood, secretary, plans about 4050 ft. of 6

and 8-in. in parts of Seventh Street and Norfolk Road. City Council will hold hearing on project Dec. 26.

Griffing Park, Port Arthur, Tex., plans pipe line extensions and replacements in water system; also installation of elevated tank and tower, and other waterworks equipment. Cost about \$40,000. Bond issue in that amount is being arranged.

Alice, Tex., plans pipe lines for water system and other waterworks installation; also extensions and improvements in sewer system. Cost about \$103,000, of which \$40,000 will represent a bond issue and remainder a Federal grant.

Glen Ellyn, Ill., has engaged Alvord, Burdick & Howson, 20 North Wacker Drive, Chicago, consulting engineers, to make surveys and estimates of cost for pipe line extensions and replacements in water system, and other waterworks improvements.

"PRODUCTION INCREASED—WELDING TIME SAVED" SAY SCORES OF CASE HISTORIES

In case after case where Murex Electrodes have gone on the job, users report important savings in welding time, increased production, and lower welding costs.

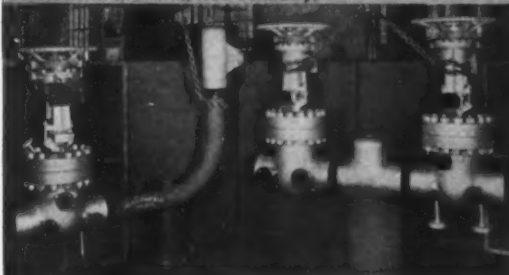
And, with all the economy of Murex Welding, there's never a sacrifice in quality. The Murex line includes electrodes that give sound, X-ray clean deposits, that assure beautifully smooth neat welds, that meet every requirement for strength and durability.

Write, now, and ask to have our representative demonstrate the Murex Electrode most suited to your needs. At the same time, make use of his broad experience. Let him lend a hand on your welding problems. There is no obligation whatever.

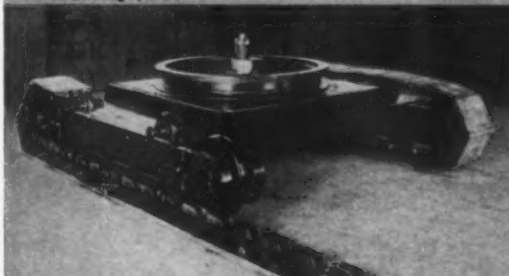
Ask, too, for the handy, pocket-size Murex pamphlet giving information on twenty different Murex Electrodes.



1 "It's easy to qualify welders with Murex," says one manufacturer of oil refinery equipment. Photo courtesy Edge Moor Iron Works, New York City.



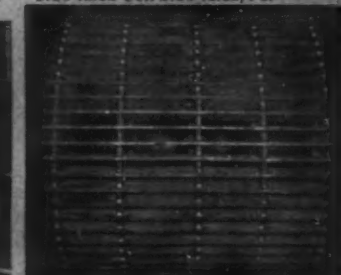
2 Production of fabricated piping was speeded 100% in a Michigan plant. Photo courtesy George B. Limbert Co., E. Chicago, Ind.



3 Quarter inch fillets are made in 30% less time at a leading Pennsylvania fabricator's. Photo courtesy The Hanson Clutch & Machinery Co., Tiffin, O.



4 In plant after plant welders prefer Murex because smooth clean deposits save time. Photo courtesy Blaw Knox Co., Blaw Knox, Pa.



5 Murex proved 37.5% faster for heavy downhand work in tests run by a large Detroit manufacturer. Photo courtesy United Welding Co., Middletown, O.

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MAGNUS ELECTREX CLEANERS

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It covers the Magnus Electrex line completely, and the results you can get on die-cast and soft metals — on brass — on steel, and on steel-brass combinations.

What is most needed in electro cleaning is speedy wetting action, rapid penetration and effective dispersing effect, followed by thorough draining of the solution and easy, quick rinsing.

These are the features which characterize Magnus Electrex Cleaners. They contain a wetting agent which so lowers solution surface tension that cleaning action is greatly speeded up and drainage and rinsing improved to a surprising degree. Drag-over in any case much reduced by the action of the cleaner, will not cause difficulties or form troublesome films or scums. Electrex Cleaners are all acid and hard-water proof.

You can cut your costs and improve your results in electro-cleaning particularly, but Magnus Electrex Cleaners are equally valuable for all metal cleaning operations.

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MAGNUS CLEANERS



Through the smoothly flowing departments of Gibson's plant go springs, clips, small stampings, washers, wire forms and countless other parts whose success involves spring action. If you have similar parts under consideration, let Gibson's experience in spring materials come to your aid.

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. . . GREAT BRITAIN . . .

. . . Mills are experiencing a better export demand

LONDON, DEC. 12 (*By Cable*)—A strong export demand for British steel has developed. It had been hoped that larger tonnages could be released for overseas trade, but Government requirements are heavy.

Galvanized sheet makers are less pressed on air raid protection and defense programs and are booking orders for shipment during the first quarter and later.

Now that import duties have been removed, negotiations for increased supplies of Continental semi-finished steel are said to be making good progress.

There is a strong demand for tin plate with unfilled orders at record high levels, but distribution of steel and tin supplies still is causing some inconvenience. An increase in the tin quota for the first quarter is expected to result in a more equitable tin supply.

The Continental reports increasing steel activity especially in northern Europe and United Kingdom. Efforts are being made to increase output materially. French mines are likely to supply additional ore to Belgium.

A British firm, Tube Investments, in conjunction with Stewarts & Lloyds and Broken Hill Proprietary Co., has commenced erection of tube mills in Australia.

Inventories Still Below Normal, Survey Shows

NEW YORK—There is no evidence as yet of unsound inventory accumulation by manufacturers, despite recent sharp rises in production and purchases of raw materials, according to direct reports from representative manufacturing concerns cooperating with the division of industrial economics of the National Industrial Conference Board. At the present time industrial inventories are about 14 per cent above the average 1936 level, but are relatively low in comparison with the present volume of production, the board said.

Three Firms Build New Plants, Expand Old Ones

CLEVELAND—Contracts for a new 20,000 sq. ft. plant for the Congress Tool & Die Co. in Detroit and for an 11,000 sq. ft. addition to the Ex-Cell-O Corp. in Detroit, and for a 27,000 sq. ft. addition for Progressive Welder Co., Detroit, have been awarded to the Austin Co.

... PERSONALS ...

B. H. GEDGE, manager of operations for the Cleveland district of American Steel & Wire Co., Cleveland, has been appointed assistant to the vice-president in charge of operations and A. J. HOYT, assistant manager of the Worcester, Mass., district operations, has been appointed to succeed Mr. Gedge at Cleveland. Mr. Gedge succeeds W. F. MUNFORD, who has been appointed assistant manager of operations of the Pittsburgh district.

Mr. Gedge has spent his entire business career with the American Steel & Wire Co. He attended Purdue University and in 1911 started as an electrician at the Cuyahoga Works. He worked his way through various operating positions and became superintendent at Cuyahoga in 1935 and manager of the Cleveland district in 1937.

Mr. Hoyt started with the Wire company in 1914 as assistant foreman at the Trenton, N. J., plant, working his way up through various positions. He was recently made assistant manager of the Worcester district.

In addition to these appointments, PETER STEWART, superintendent of South works, Worcester, will succeed Mr. Hoyt as assistant manager of the Worcester district, and G. A. GLEASON has been made general superintendent at South works, while L. J. WESTHAVER has been made superintendent of the steel works and F. P. LEAHEY

has been made superintendent of the wire mill, both at South works.

♦ ♦ ♦

DOUGLAS F. G. ELIOT, general commercial manager of the Western Electric Co., New York, for the past three years, has been appointed general purchasing agent. A Yale graduate of 1909, Mr. Eliot has been connected with the company since 1911, when he began as a clerk at its New York distributing house.

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A. G. MONTGOMERY, American Steel & Wire Co. superintendent of hot mills at the Cuyahoga works, Cleveland, has been appointed assistant chief engineer for the company. F. W. LORIG has been appointed engineer for appropriations and properties. W. V. MAGEE has been made construction engineer. F. E. ROBINSON becomes assistant construction engineer.

Mr. Montgomery was graduated from Pennsylvania State College as an electrical engineer and during summer vacations worked with National Tube Co. He started as a district engineer in Pittsburgh for the wire company in 1914. He succeeds F. R. BURNETTE, who was recently transferred to Carnegie-Illinois Steel Corp.

Mr. Lorig has been with the company since 1915. Mr. Magee started with the National Tube Co. in 1925 and joined American Steel & Wire in

1927. He has been assistant construction engineer. Mr. Robinson, after previous service in the steel industry, joined the Wire company in 1929 and has been section head draftsman.

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WALTHER MATHESIUS, vice-president, operations, United States Steel Corp. of Delaware, was the principal speaker last week at a dinner which closed a metallurgical conference held at Carnegie Institute of Technology, Pittsburgh. More than 185 persons registered for the nine lectures of the conference.

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J. R. LINNEY has been made district manager of the consolidated Northern New York mining operations of Republic Steel Corp. in the Adirondack district. In this district will be the Port Henry division, with R. J. LINNEY as general superintendent, and the Chateaugay division, with W. J. LINNEY as general superintendent. T. F. MYNERS is to be assistant general superintendent of the Port Henry division. J. R. LINNEY was vice-president of the Chateaugay Ore & Iron Co prior to the leasing of this property by Republic last spring.

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LOUIS H. BRENDL, heretofore assistant sales manager of the Hancock Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, has been promoted and will assist C. H. BUTTERFIELD, general sales manager of the Manning, Maxwell company. Mr. Brendel's new duties include the super-



B. H. GEDGE, assistant to vice-president in charge of operations, American Steel & Wire Co.



A. J. HOYT, manager of operations, Cleveland district, American Steel & Wire Co.



PETER STEWART, assistant manager of operations, Worcester district, American Steel & Wire Co.

vision of sales promotion and jobber relations for the Ashcroft American Gauge Division, the Consolidated Safety Valve Division, the American Schaeffer & Budenberg Instrument Division, and the Hancock Valve Division.

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GEORGE J. CONNELLY has been named production manager and chief engineer for the Covered Wagon Co., Mt. Clemens, Mich. Mr. Connelly, active as a body engineer for about 20 years, formerly was division superintendent for Packard Motor Car Co.

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DR. V. N. KRIVOBOK, associate director of research, Allegheny Ludlum Steel Corp., was scheduled to deliver the first in a series of lectures before Western City chapters of the American Society for Metals at Houston, Tex., on Dec. 8. The topic of Dr. Krivobok's address was "Recent Developments in Heat and Corrosion Resisting Steels."

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R. L. FORNEY, assistant to the managing director of the National Safety Council, has been appointed director of the council's industrial division, effective Jan. 1. He will replace W. DEAN KEEFER, who ended 21 years with the council to join the Lumbermens Mutual Casualty Co. as assistant to the vice-president in charge of safety engineering, with offices in Chicago. Mr. Forney, in addition to his duties as assistant to the managing director, a responsibility he will retain, directed the Council's statistical division for 12 years. In this period he brought the division to nationally recognized leadership on accident facts and figures in every field of safety. He directed and edited the annual publication of "Accident Facts," a statistical yearbook on accident totals, causes and costs, and is widely known for his understanding of industrial safety problems.

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ARTHUR G. GREENAMEYER who retired recently as operating manager of the Buffalo district for Republic Steel Corp., had been in the employ of Republic since organization of the company and prior to that time was assistant general superintendent of the Donner Steel Co. from 1920 to 1928 and then general superintendent. He attended the University of Wisconsin and the University of Michigan.

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T. E. SAVAGE has been appointed purchasing agent of the Erie Railroad Co., Cleveland, to fill the vacancy caused by the death of F. W. Holt.



A. G. GREENAMEYER, recently retired manager of the Buffalo district, Republic Steel Corp.

W. D. HARRIS has been promoted to the superintendency of the blast furnaces at Fairfield of the Tennessee Coal, Iron & Railroad Co., Birmingham. He began work with the company in 1917 as a day laborer, resigned in the early part of 1918 to enter the army and returned when the war was over. He was promoted steadily until he became assistant superintendent of the Fairfield furnaces and now heads the operations.

G. M. HARRIS, (no relation to W. D. Harris), who has been superintendent of blast furnaces at Ensley since Dec. 1, 1935, is now assistant general superintendent of the Ensley steel works. He is a graduate of the chemical engineering department of Howard College (Birmingham) and has spent his principal business years in that area.

J. A. MAXWELL, has been named superintendent of the Ensley blast furnaces from the post of assistant superintendent. He is succeeded in the latter capacity by JOHN R. HUNT, practice man at Ensley blast furnaces.

J. J. SHANNON, heretofore turn foreman in the cold reduction department of the Fairfield tin mill has been named assistant superintendent of the blast furnaces at Fairfield.

It is interesting that all of these new key men, at the most extensive steel and blast furnace operations in the South, have been educated entirely in the South, with the exception of Mr. Shannon, who went to Cornell for a year.

M. R. CROSSMAN, formerly with the Gisholt Machine Co., Madison, Wis., has joined the staff of the machine and small tool division of Barber-Colman Co., Rockford, Ill. Mr. Crossman will handle all matters pertaining to advertising and publicity.

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R. L. JOHNSTONE, who has had a long experience in the screening, conveying and feeding equipment industry, has been appointed manager of the shaker division of the Ajax Flexible Coupling Co., Westfield, N. Y.

♦ ♦ ♦

WILLIAM UFER and WALTER LISCHETT, who have spent several years training in the factory and in the service department of the Mercoide Corp., Chicago, have been transferred to the sales department of the company.

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ROBERT E. DILLON, president of the Lake Erie Engineering Corp., Buffalo, has been elected a director of the Marine Trust Co., Buffalo.

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DR. JOHN JOHNSTON, research director of the United States Steel Corp., gave an address on "The Application of Science to Steel" before the Southeast section of the American Institute of Mining and Metallurgical Engineers at its fall meeting held in Birmingham on Dec. 8.

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LORENZ HEISE, director of the A. O. Smith Corp. production laboratory, Milwaukee, Wis., was seriously injured in a triple automobile crash near Belvidere, Ill., recently. Both he and his wife received skull fractures and are confined to a Belvidere hospital. Seven other persons were injured in the crash.

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C. H. VAUGHAN has been appointed representative for Allegheny Ludlum Steel Corp. in the Southeastern states, with headquarters at Birmingham. His duties will include the coordination of the various Allegheny Ludlum representatives and agencies in that area.

Belgian Steel Output Rising

LONDON—Belgian steel production improved in October under the influence of Dutch, Swiss, and Scandinavian demand. Output rose from 206,000 tons in September to 255,000 tons. French ore deliveries continue normal but below the requirements of a maximum output, and production is now practically stabilized at existing levels.

INDUSTRIAL NEWS FROM CANADA

Metal Plants' Output in 1938 Valued at \$550,493,894

PRODUCTION of iron and steel and their manufactures in 1938 in 1399 metal-working plants in Canada had a value of \$550,493,894, according to preliminary figures compiled by the Dominion Bureau of Statistics. This value was 11.9 per cent below the 1937 figure, but it was still higher than any other year since 1930. The 1399 plants eligible for inclusion in the iron and steel group in 1938 employed 122,762 workers who were paid \$156,106,958 in wages.

Value of the output of the various industrial groups covered by the 1938 data was as follows: Pig iron, steel and rolled products, \$59,146,150; iron castings and steel forgings, \$35,957,296; boilers, tanks and engines, \$10,385,373; machinery, \$44,607,567; automobiles, \$116,746,239; automobile parts, \$38,690,610; railway rolling stock, \$81,936,751; bridge and structural steel, \$15,057,225; farm implements, \$21,616,961, and aircraft, \$6,927,105. This last figure represents an increase of 300 per cent over the 1937 total.

Canadian imports of iron and steel products in 1938 were valued at \$162,554,216, with the United States accounting for 83 per cent of this figure. Imports from United Kingdom made up 13 per cent. Exports in 1938 amounted to \$62,327,446, with 22 per cent of this total going to United Kingdom and 9.6 per cent to the United States.

British Columbia Shipyards Expect Orders for Boats

VANCOUVER — Canada's War Supply Board has called tenders for the first war-time shipbuilding orders. Thirty sub-chasers are to be constructed at an estimated gross value of \$12,000,000.

British Columbia shipyards expect to gain a large share of such orders. Two yards have constructed additional ways at North Vancouver, B. C., in anticipation of such business.

At the present time there are six shipbuilding yards in operation in British Columbia able to handle such orders, and expecting to receive contracts of varying sizes. During the last war yards here handled a major share of shipbuilding, mostly in cargo

vessels. Then, both wooden and steel hulls were constructed, but it is anticipated that almost all construction will be steel for current needs.

Construction Work Expanding in Canada

TORONTO — Directly and indirectly the outbreak of war has been responsible for sharp increase in construction activities in Canada. This has been specially true with regard to industrial plant construction and during the past couple of months many companies have started or are contemplating work on new plants or additions to existing units with consequent heavy purchases of steel, builders' hardware, machinery and equipment. The war, with its potential heavy demands on the steel and other industries, has been reflected in a sharp gain in earnings of the various companies which will be revealed when reports for the last three months of the year are made public. This gain in business, however, while due to the war, was not the result of war orders, but on the contrary the result of buyers jumping into the market for supplies to obtain requirements in advance of possible price advances or a shortage that may develop when plants are under pressure to provide war needs.

Canadian Mills Booking into 1940

TORONTO — Canadian steel producers are now taking orders for early 1940 delivery, but have announced no revision in prices. On current bookings producers are maintaining the policy of making known the price at time of delivery and are giving no definite quotations. This policy applies to all lines of finished and semi-finished steel. Sheet sales for early 1940 delivery have been fairly heavy during the week and one large producer has closed contracts to the end of February, while all production has been disposed of until the end of January. Bars also are in fair demand with booking under way for the early part of next quarter. Wire and wire products are attracting considerable attention and there is continued heavy demand from Government officials and private companies for fencing mate-

rials for protection against sabotage. Small steel lines also have a steady market demand and mills in the Ontario district are running at capacity to keep pace with orders. It is expected that backlogs next year will reach the largest volume in several years and production on a capacity basis is expected for the duration of the war.

Munitions Orders Placed in Canada

OTTAWA — Transport Minister Howe, in his first statement as minister responsible for war purchases, announced that during the week ended Dec. 9 orders totaling \$2,800,000 were placed by the War Supply Board. This brings to almost \$48,000,000 the sum allotted for war purchases by the Government since the outbreak of war and does not include the \$25,000,000 designated for railroad equipment. All the orders approved by the War Supply Board during the week were given Canadian firms, with two exceptions—a \$500,000 order to the British Government for purchase of certain types of ordnance required for Canadian defenses and \$280,000 spent with manufacturers in the United States for special aviation and optical supplies, not obtainable in Canada.

Among the articles purchased are such items as tools, machinery, hardware, aircraft supplies and accessories, motor vehicles, surgical supplies, marine equipment, lumber and building products, gas masks, knives, clothes, coal, coke, gasoline, etc. Several large construction jobs are to be undertaken.

The following list indicates the variety of recent purchases:

Aircraft Supplies—Noorduyn Aviation, Ltd., Montreal, \$63,500; Irvin Air Chute, Ltd., Ottawa, \$308,300; British Aeroplane Engines, Ltd., Montreal, \$91,935; MacDonald Brothers Aircraft, Ltd., Ottawa, \$7,300.

Marine Equipment—Burrard Dry Dock Co., Ltd., Vancouver, B. C., \$48,000; Halifax Shipyard, Ltd., Halifax, N. S., \$42,500.

Machinery—John Bertram & Sons Co., Ltd., Montreal, \$12,714; A. R. Williams Machinery Co., Ltd., Toronto, \$5,125.

Barrack Stores — General Steel Wares, Ltd., Montreal, \$51,310; Great

West Metal Products, Ltd., Winnipeg, \$7,100; Taylor Brothers Cutlery Co., Ltd., Hamilton, \$5,500.

Announcement was made from Ottawa that a shell contract had been placed with the Massey-Harris Co., Ltd., Toronto. J. S. Duncan, vice-president of the company, stated that his company had received the first contract to be let by the British Purchasing Committee in Canada, but stated that the sum involved was not \$5,000,000, as reported. The order was placed by the Canadian War Supply Board. The order received by Massey-Harris Co. is said to include the outer shells for mine bombs, for which heavy sheets will be used, bolted together. This is the first of the munitions orders to be placed in Canada by the board for the British Government. Further contracts involving expenditure of many millions of dollars will be placed soon and will be distributed among a number of Canadian companies.

From unofficial sources it is learned that several other important British contracts for war materials were placed during the week, but details are not available, as the Ottawa Government has made no official announcement, and corporation officials are restrained by war secrecy regulations from giving out information. Reports are to the effect, however, that other leading companies have either received contracts or are assured of a moderate amount of business. In addition to the Massey-Harris contract, it is stated in reliable quarters that Dominion Bridge Co. will receive a large shell contract, while another company said to be slated for large contracts for production of airplane parts is Robert Mitchell Co., Montreal. In the last war the company produced shell parts and recently has installed equipment for making airplane parts.

Talk of Steel Plant In Western Canada

VANCOUVER — There may be large scale developments in the iron and steel industry on Canada's Pacific coast, John F. Walker, deputy minister of mines, told the mining committee of the British Columbia Legislature recently.

Prior to the outbreak of war negotiations were under way with British capitalists to launch such an industry. While the outbreak of war delayed these plans, Dr. Walker expressed the opinion that they might yet materialize. "I cannot say more, but there

is a possibility something may be doing in iron and steel before long."

Establishment of a steel industry on the coast has been talked about for years, but have usually faded when the matter of government concessions and competitive costs came up. It is believed that the smallest operation that could be established with hope of economic success would be on a 450-tons a day basis. The cost would be about \$20,000,000 to \$25,000,000.

The Provincial Government has been conducting a survey of low-cost power resources (mainly water power and hydro-electric potentials) the extent and grade of iron and coal deposits. This survey has included consideration of the possibilities for the manufacture of iron, steel, aluminum and other products.

Industrial Expansion

H. Lunenfeld & Son, Ltd., 200 Beverley Street, Galt, Ont., is considering plans for two factory additions of one story, 16 by 32 ft., and 41 by 85 ft., brick and steel construction.

Foundations have been completed and additional contracts have been awarded for addition to plant of Dominion Foundries & Steel, Ltd., Hamilton, Ont. Canadian Engineering Contracting Co., Ltd., 25 Hughson Street, S., has general contract; Hamilton Bridge Co., has steel contract.

S. V. McLeod, purchasing agent, is receiving bids on materials in connection with addition to tin plate and sheet mill, which will double present capacity for Algoma Steel Corp., Sault Ste. Marie, Ont.

Intrepid Time Recorders, Ltd., 1502 St. Catharine Street, West, Montreal, will erect manufacturing plant on Devonshire Road, Greenfield Park, Que.

Philibert Cliche plans erection of one story, 75 by 225 ft., plant at Lac Megantic, Que., for production of war munitions, shells, etc., to cost \$25,000.

Wood-Cadillac Mines, Ltd., 437 St. James Street, West, Montreal, will install milling plant at its property at Kewegama, Que., to cost \$225,000, and has awarded general contract to Mill Builders, Ltd., Sudbury, Ont. Julius M. Cohen is engineer.

St. Lawrence Metals & Alloys, Ltd., has awarded steel contract to Farand & Delorme, Ltd., 385 St. Martin Street, Montreal, for plant addition at Beauharnois, Que., to cost \$25,000.

Taylor Electric Mfg. Co., Ltd., 521 Adelaide Street, London, Ont., is

building an addition to its plant about 7000 sq. ft., basement and first floor. A. J. Taylor is president.

Ingersoll Machine Co., Ingersoll, Ont., manufacturer of machinery and parts, plans one-story addition, 100 x 175 ft., to be equipped as a machine shop. Erection will be carried out by day labor. Cost about \$60,000 with equipment.

... OBITUARY ...

FRANK B. BAIRD, for years an outstanding figure in Buffalo industry, died in that city on Nov. 15, aged 86 years. Among numerous other things he pioneered iron manufacture in that section. He went to Buffalo 51 years ago and immediately recognized its potentialities as a pig iron center. His first undertaking was the largest merchant furnace plant in the United States at that time. In 1889 he organized the Tonawanda Iron & Steel Co. and in 1890, litigation having been settled against the Union Iron Co. of Buffalo, he obtained a long-term lease and option on the plant. His ability as an organizer was shown in the next 10 years when he founded three furnaces, the Buffalo Furnace Co. in 1892, the Union Iron Works in 1898, the Buffalo Charcoal Iron Co. in 1899 and consolidated them in 1900 as the Buffalo Union Furnace Co., of which he became president. He was also president of the Canadian Furnace Co., Ltd., and vice-president of the Buffalo Iron Mining Co. With the exception of the Wickwire-Spencer Steel Co. Mr. Baird was instrumental in the development of every blast furnace in the Buffalo district, including the Lackawanna Steel Co. and the Bethlehem Steel Co.

♦ ♦ ♦

WILLIAM DICKSON PIERSON, secretary and director of the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., died at his home in that city Dec. 2, aged 67 years. He was graduated from Stevens Institute of Technology in 1894. He joined the engineering staff of the Waterbury Farrel Foundry & Machine Company in 1895, thus having completed nearly 45 years continuous service with that company.

♦ ♦ ♦

ALBERT E. HARRIS, for many years a salesman for the Brown & Sharpe Mfg. Co., died Nov. 30 in Providence, R. I., after a short illness. For over 40 years, he had served in manufacturing and sales departments of the company.

Fritz J. Frank Dies

FRITZ JOHN FRANK, president of The Iron Age Publishing Co., died on Dec. 8 at the Northern Westchester Hospital, Mt. Kisco, N. Y., after a short illness. He was 68 years of age and is survived by his widow, Anna Raynor Frank, daughter of the late J. Andriance Bush, whom he married in 1909, and also by a brother and sister.

Mr. Frank devoted a lifetime of hard work and high accomplishment to the publishing business, the last 30 years of which were with The Iron Age, of which he was president and director at the time of his death. He was personally known to many of the readers and advertisers of this publication, among whom he numbered a host of friends. Active also in association work for the upbuilding of the publishing industry and its service, he was an outstanding figure in The Associated Business Papers and the president of that organization in 1923-24.

Fritz Frank was born in Emporium, Pa., his parents being Joseph Warren Frank and Eliza Campbell Frank. He was graduated from Rollins College, Winter Park, Fla., with the degree of Bachelor of Arts in 1896 and was a member of Kappa Alpha fraternity. Shortly after this he commenced his publishing career by joining the Colliery Engineer and later Mines and Minerals as advertising manager. Later, in 1902 and 1903 while with the latter publication, he made a tour of the world, investigating possible markets for American machinery. In 1906 he joined the Mining and Scientific Press as Chicago representative, continuing with that publication until 1910, when he came with The Iron Age as advertising manager in the New York territory. In this capacity he established an outstanding record for successful performance and contributed very largely to the upbuilding of this publication.

In 1911, Mr. Frank was made secretary of the David Williams Publishing Co., the predecessor of The Iron Age Publishing Co., and in 1918 was elected vice-president. In 1919, one year later, he became president and occupied this position to the time of his death.

In addition to his executive positions with The Iron Age, Mr. Frank was also executive vice-president of The Chilton Co. and held directorships in the Robbins Publishing Co., the Business Publishers International Corp., the Newton Falls Paper Co., and the Savage Arms Corp.

He was a trustee of Rollins College and in 1935 received a Decoration of Honor from that institution for "a distinguished career in business and outstanding service to his alma mater."

Mr. Frank was a member of the Engineers Club of New York and a past president and governor of the Machinery Club of New York. In addition to his many business activities, he was an enthusiastic sportsman with an international reputation for his kennel of pointers and setters among which were many champions.

Mr. and Mrs. Frank resided at Madison, N. J., for the past seven years and previously at their farm "Hardscrabble" at Pleasantville, Westchester County, N. Y.

A special memorial service will be held in the Knowles Memorial Chapel of Rollins College, Winter Park, Fla., on Feb. 24, at 4 P. M., which friends of Mr. Frank are invited to attend.

Fritz Frank will be long remembered and loved by all who knew him and especially by his business associates and fellow workers to whom he endeared himself through a never-ceasing display of sterling qualities.



FRITZ J. FRANK

Iron and Steel

WASHINGTON — Exports of iron and steel from the United States were slightly higher at 255,081 gross tons valued at \$16,835,795 in October, preliminary figures just released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal. This was a gain of about 4 per cent in quantity and of 8.75 per cent in value over the 244,933-ton, \$15,481,546 trade of September, and topped the 201,473-ton, \$11,463,580 trade of October, 1938, by a wide margin.

Ten months exports—1,772,069 tons valued at \$116,555,474—trail those of the comparable period of 1938—1,786,660 tons valued at \$128,104,620—by 0.8 and 0.9 per cent respectively.

Shipments to Europe Increase

Despite the relatively slight increase reported in the total October export trade, there were interesting shifts in the trade with Continental areas. Shipments to Europe, chiefly because of a marked gain in the trade with the United Kingdom, rose from 51,879

Iron and Steel Imports (In Gross Tons)	October		Ten Months Ended October	
	1939	1938	1939	1938
Pig iron	5,077	1,174	34,500	30,358
Sponge iron	256	18	1,531	380
Ferromanganese ¹	3,115	2,281	29,665	14,221
Spiegeleisen	2,364	2,720	29,562	9,771
Ferrochrome ²	289	61	1,398	100
Ferrosilicon ³	66	1	278	610
Other ferroalloys ⁴	2,305	5,524	27,388	13,183
Scrap	13,472	11,778	124,451	68,624
Pig iron, ferroalloys and scrap	1	32	12	197
Steel ingots, blooms, etc.	166	21	434	491
Billets, whether solid or hollow	1,152	415	8,717	3,997
Wire rods	1,319	468	9,163	4,685
Semi-finished steel	107	86	2,350	1,101
Concrete reinforcement bars	711	1,261	15,975	683
Hollow steel bars	82	5	660	452
Merchant steel bars	1	8	24	303
Iron slabs	8	61	1,386	5,329
Boiler and other plate (including skelp)	2	3	82	71
Sheets, skelp, and saw plate	14	8	65	91
Die blocks or blanks, etc.	420	3,279	37,868	31,970
Tin plate, taggers' tin andterne plate	235	462	5	235
Structural shapes	1,484	157	6,289	3,041
Sashes and frames	82	822	4,462	4,924
Sheet piling	383	2,421	25,421	19,785
Rails and track material	185	1,867	7,126	8,692
Welded pipe	100	1,079	15,917	13,638
Other pipe	286	973	14,750	11,230
Cotton ties	2	199	2,075	1,168
Other hoops and bands	273	2	7	9
Barbed wire	243	2,592	2,592	2,098
Round iron and steel wire	54	1,437	1,437	1,749
Telegraph and telephone wire	18	1,428	1,428	1,178
Flat wire and steel strips	73	6,977	6,977	6,081
Wire rope and strand	10	30	96	186
Other wire	40	324	324	379
Nails, tacks, and staples	4,293	13,548	148,963	130,207
Bolts, nuts, and rivets	29	9	144	76
Horse and mule shoes	104	1,478	1,478	1,225
Rollad and finished steel	76	538	1,037	3,339
Malleable iron pipe fittings				
Cast iron pipe and fittings				
Castings and forgings				
Total	19,189	26,445	285,236	208,156

¹ Manganese content; ² chrome content; ³ silicon content; ⁴ alloy content.

Iron and Steel Exports (In Gross Tons)	October		Ten Months Ended October	
	1939	1938	1939	1938
Pig iron	50,134	61,339	121,494	373,846
Ferromanganese and spiegeleisen	251	6	792	236
Other ferroalloys	861	70	2,639	997
Scrap, iron and steel	334,664	221,466	3,075,998	2,381,729
Scrap, tin plate	1,100	1,643	14,500	13,927
Waste-waste tin plate	1,011	845	7,871	6,137
Pig iron, ferroalloys and scrap	388,021	285,369	3,223,294	2,776,872
Ingots, blooms, billets, sheet bars	13,633	5,980	90,712	146,632
Ingots, etc., alloy steel, incl. stainless	5,004	1	19,766	7,215
Skelp	14,085	13,817	44,517	27,541
Wire rods	2,779	1,232	20,394	20,376
Semi-finished steel	35,501	21,030	175,389	201,764
Bars, plain and reinforcing	15,395	11,493	134,047	119,184
Bars, alloy steel	643	224	9,785	3,968
Bars, stainless steel	6	4	241	546
Iron bars	56	152	544	1,236
Plates, plain and fabricated	16,619	19,555	206,863	178,655
Plates, alloy steel	83	175	1,949	2,253
Plates, stainless	14	9	107	252
Sheets, galvanized steel	11,310	7,148	82,410	59,192
Sheets, galvanized iron	439	74	4,803	3,067
Sheets, black, plain steel	19,562	13,830	218,103	155,175
Sheets, alloy steel	502	498	3,095	3,180
Sheets, stainless	103	99	768	1,170
Sheets, black iron	1,293	632	6,678	6,289
Hoops, bands, strips, plain steel	10,081	6,052	64,924	49,083
Hoops, bands, strip steel alloy	35	35	436	310
Hoops, bands, strip steel, stainless	137	34	859	469
Tin plate and taggers' tin	25,764	12,330	201,263	135,584
Terne plate (incl. long ternes)	1,133	214	4,591	3,747
Structural shapes, plain material	10,201	5,944	90,128	70,937
Structural material, fabricated	2,687	4,423	26,944	32,735
Sheet piling	752	276	6,996	2,864
Tanks, steel	2,330	3,217	21,118	33,757
Steel rails	3,553	6,164	48,377	73,373
Rail fastenings, switches, spikes, etc.	848	816	13,305	11,009
Boiler tubes	2,193	602	8,061	7,404
Casing and oil line pipe	9,734	3,981	64,956	61,775
Pipe, black and galv. welded steel	3,971	2,534	32,523	19,866
Pipe, black and galv. welded iron	577	296	5,582	4,516
Plain and galvanized wire	5,271	5,124	44,006	39,384
Barbed wire and woven wire products	7,419	4,541	43,944	29,988
Wire rope and other products	2,050	708	11,418	8,363
Nails and tacks	3,416	2,520	21,790	20,389
Bolts, nuts, rivets and washers except track	814	674	6,766	6,643
Other finished steel	1,114	201	6,901	2,693
Rollad and finished steel	160,105	115,579	1,394,281	1,119,056
Cast iron pipe and fittings	3,680	1,594	32,686	26,012
Malleable iron screwed fittings	465	280	3,523	2,606
Car wheels and axles	986	1,235	23,179	18,488
Castings, iron and steel	601	448	4,616	5,278
Castings, alloy steel, incl. stain less	149	60	1,263	683
Forgings, plain	2,027	382	10,654	6,936
Forgings, alloy steel, incl. stainless	121	450	1,553	758
Castings and forgings	8,229	4,449	77,474	60,761
Total	591,856	425,427	4,870,438	4,188,453

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)	October		Ten Months Ended October	
	1939	1938	1939	1938
United Kingdom	4,132	7,015	22,365	11,965
British India	945	736	5,457	1,830
Germany	4,119	6,473	12,928	...
Netherlands	...	...	...	...
Canada	...	...	...	...
France	...	...	...	...
Belgium	...	...	...	...
Norway	...	...	...	3,538
Sweden	...	...	100	55
Russia	...	...	...	...
All others	...	...	105	...
Total	5,077	11,870	34,500	30,358

October Imports of Iron and Manganese Ores

(In Gross Tons)	Iron Ore		Manganese Concentrates 35 Per Cent or Over	
	1939	1938	1939	1938
Canada	6,495	...	4,516	...
Cuba	22,000	21,000	5,285	3,122
Chile	88,400	155,200	...	...
Spain	...	...	...	...
Norway	32,299	25,116	...	...
Sweden	46,605	14,546	...	...
French Africa	...	7,480	...	...
Russia	...	...	17,792	4,914
India	...	...	10,532	8,967
Brazil	...	...	...	...
Gold Coast	...	...	23,606	3,924
Other countries	7,639	3,060	...	...
Total	203,438	226,402	57,215	15,327

Exports Gained Only Slightly in October

tons in September to 74,632 in October, while there was a roughly corresponding decline in the trade with the Far East—to 49,607 tons from September's 69,743 tons. The trade with North and Central America and the West Indies increased only slightly—from 78,155 tons to 78,628 tons, but the trade with South America climbed to 39,936 tons from 34,846 tons and that with Africa rose to 12,278 tons from 10,310 tons.

Canada, with purchases totaling 53,137 tons, ranked first followed by the United Kingdom, 46,037 tons; Japan, 15,805 tons; the Philippine Islands, 13,724 tons; and Sweden, 11,070 tons.

Pig Iron Leading Product

In point of tonnage, pig iron was the leading product in the October trade,

total shipments of 50,134 tons including 39,354 tons sent to the United Kingdom and 7190 tons which went to Sweden. The trade in tin plate—25,764 tons—included 3498 tons exported to Brazil, 3376 tons to Canada, and 3085 tons to Egypt. The 19,562-ton trade in non-alloy black steel sheets included shipments of 7773 tons to Canada, 1792 tons to Egypt, and 1659 tons to Mexico, while leading markets for non-alloy "other" plates—15,567 tons—included Canada, 4442 tons, Sweden, 2867 tons, and Argentina, 1242 tons.

Scrap Exports Rise Slightly

Exports of scrap from the United States in October—336,775 tons valued at \$16,835,795—were slightly greater than the 330,680-ton, \$15,481,546 trade of September. A year ago—in Sep-

tember, 1938—this trade amounted to 223,954 tons valued at \$3,238,232.

Cumulative exports for the 10 months' period ended with October stand at 3,098,367 tons valued at \$46,572,685. During the corresponding period of 1938, 2,401,793 tons of scrap valued at \$37,034,379 had been sent to foreign buyers.

The 336,775-ton October total noted above included 334,664 tons of iron and steel scrap, 760 tons of tin plate scrap, 340 tons of tin plate circles, etc., and 1011 tons of waste-waste tin plate.

Principal purchasers of iron and steel scrap during October were Japan, 248,176 tons; the United Kingdom, 38,563 tons; Canada, 26,362 tons; Cuba, 8249 tons; Italy, 7037 tons; and China, 4272 tons.

New High Ingot Production Record Made in November

NOVEMBER was the second consecutive month in which the steel industry established a new high record in production of open-hearth and bessemer steel ingots, according to the monthly report of the American Iron and Steel Institute, showing that a total of 5,462,616 gross tons of ingots was produced in November.

Until October of this year the record month for steel production had been May, 1929, when 5,286,246 gross tons of ingots was produced. That record was first superseded by the October, 1939, output of 5,393,821 gross tons, which was in turn exceeded by the November output.

The total tonnage produced in November was 54 per cent higher than the total of 3,558,363 gross tons produced in November, 1938, which was the best month in last year.

During November of this year the steel industry operated at an average of 93.26 per cent of capacity, compared with 89.17 per cent of capacity in October and with 61.81 per cent of capacity in November, 1938.

Ingot production averaged 1,273,337 gross tons a week in November of this year, as against weekly averages of 1,217,567 gross tons in October and 829,455 gross tons in November a year ago.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936, Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
1938						
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter ..	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter ..	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months ..	9,889,435	763,843	10,788,583	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.29
August	2,309,207	169,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter ..	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter ..	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	23,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,174,352	716,558	4.43	52.48
February	2,755,130	196,186	2,988,649	747,162	4.00	54.72
March	3,167,782	194,694	3,405,370	768,707	4.43	56.39
1st Quarter ..	8,909,367	538,374	9,568,371	744,041	12.86	54.49
April	2,731,451	205,771	2,974,246	693,297	4.29	50.78
May	2,715,940	170,156	2,922,875	659,791	4.43	48.32
June	2,898,552	187,478	3,125,288	728,505	4.29	53.35
2nd Quarter ..	8,345,943	563,405	9,022,409	693,498	13.01	50.79
1st 6 Months ..	17,255,310	1,101,779	18,590,780	718,623	25.87	52.63
July	2,893,916	229,380	3,162,534	715,505	4.42	52.40
August	3,469,453	246,952	3,763,418	849,530	4.43	62.22
September	3,881,564	297,128	4,231,310	988,624	4.28	72.41
3rd Quarter ..	10,244,933	773,460	11,157,262	849,753	13.13	62.23
9 Months	27,500,243	1,875,239	29,748,042	762,770	39.00	55.86
October	4,922,070	405,000	5,393,821	1,217,567	4.43	89.17
November	4,990,388	404,556	5,462,616	1,273,337	4.29	93.26

Program for U.S. Recovery Is Offered by Industrial Congress

THE objective before American industry is the maximum employment of the nation's manpower to the end of gaining national strength and security, the Congress of American Industry, sponsored by the National Association of Manufacturers, declared last week at its meeting in New York.

Many business and industrial leaders attended the gathering, which adopted a program for restoring national prosperity on a "basis of free enterprise and reasonable regulation by the Government."

The congress asked that unreasonable curbs on business be ended and declared that pump-priming has failed and that the Government should return to a policy of economy in spending.

Program Is Adopted

It adopted a platform which covered the employees, investors, consumers and industry itself. Eight necessary steps to recovery for American industry were listed as follows:

1. Maintenance of individual initiative and free enterprise, in competition for the consumer's dollar, on the basis both of price and quality.

2. Recognition of the social value of the profit motive as a powerful incentive to all productive effort and of the economic need for profits in industry sufficient to maintain and expand existing enterprise.

3. Recognition of the vital importance of private savings and investment for providing plant equipment and other resources required for new enterprise and additional employment, and for the production of a larger volume and variety of goods and services for more people.

4. Reduction of the controllable costs of production and distribution of both durable and consumption goods, to the end that prices may be reduced and demand for all goods and services stimulated, and their use and enjoyment by the ultimate consumer increased.

5. Extension of research—market research, engineering research and research in the fields of science—to the end of developing new and better products at lower prices, with the prospect of increasing production, consumption and employment.

6. Maintenance by each employer of an equitable and fairly applied policy of employer-employee relations.

7. Maintenance of such equitable wage rates as will promote increased production and employment and a higher income to workers. Application of this principle requires intimate knowledge of particular conditions which affect each enterprise, with definite consideration of the following:

(a) Reasonable hours of employment, affording greater reproductive opportunity, with due regard to conditions in the community; (b) the greatest possible regularity of production as a means to continuity of employment; (c) where regularity of production is impractical, the greatest possible continuity of employment through a reasonable variation of working hours.

8. Enlightenment of the public as to the obstacles which obstruct progress toward the attainment of the objectives set

forth above and as to the measures necessary for the removal of those obstacles—whether in the field of government, labor, management or elsewhere.

Cut Government Expense

At the same time the platform, while urging that a "determined effort should be made to reduce the expenses of government . . . at the earliest possible moment," said that "it is in the sphere of its own immediate activity that the challenge to industrial management lies." The managers of industry must continue unabated their efforts in behalf of increased production and employment, with ever increasing realization of the contribution this effort can bring.

"Success of any business," the platform said, "and hence the welfare of its employees, depends upon finding a workable method of achieving harmony. No single method can be applied to all industrial units or to all labor groups. It is, rather, the responsibility of management in each individual plant to seek a proper method by which the interest of all those immediately concerned can best be served. The employee should have the right to join any labor organization he wishes, or none at all, as he may deem best in his own interests. The action he takes in this regard should be arrived at as a matter of his own free will and volition, without coercion, duress or intimidation from any source."

Caution On Short Wheels

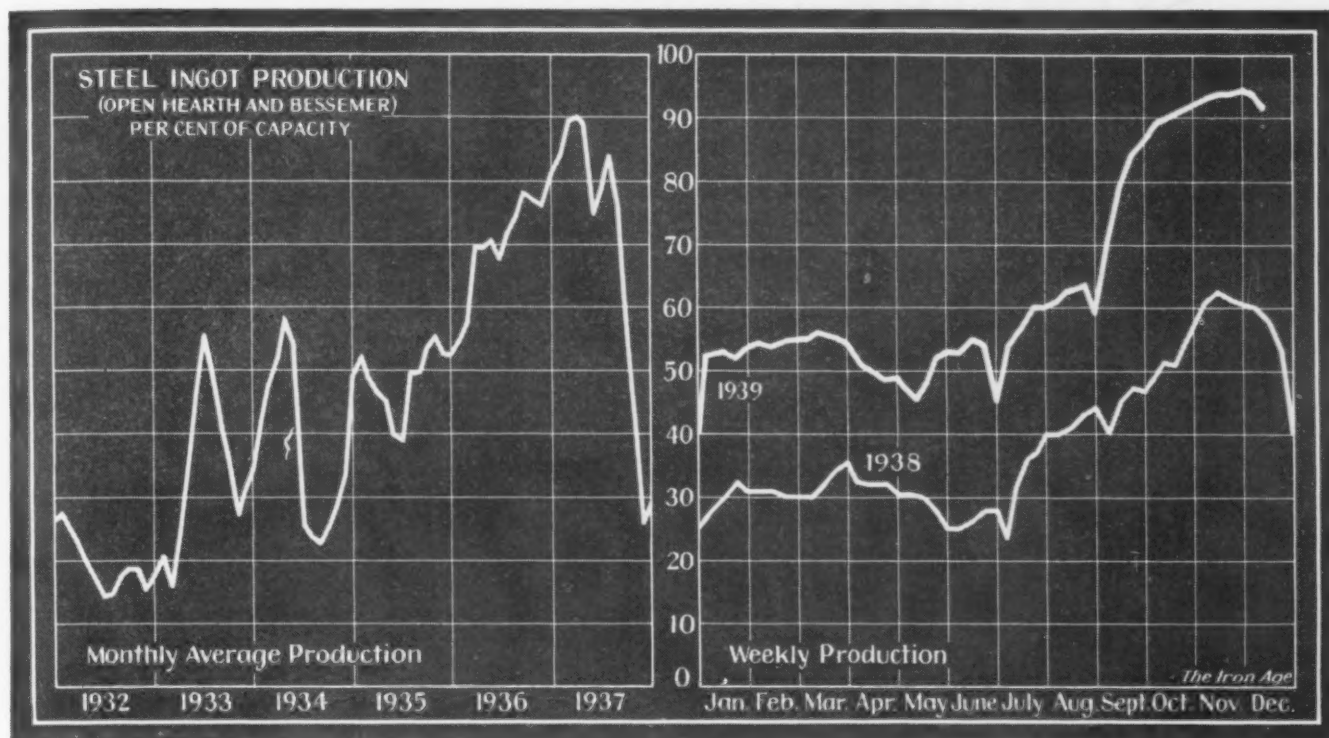
At times undue limitations of hours of work, however well-intentioned, may interfere seriously with the constructive planning and management of any business, the industrial congress warned. "For example, where there is the desirable variation in hours of work in the interest of maintaining a regular working force, the exaction of overtime periods for temporary periods of overtime work is not a solution; the regular wage rate may be at a level which allows for overtime work, with no effect, therefore, on the average labor cost of the product—nor, incidentally, is there any effect upon the annual income of the employee.

"On the other hand, if overtime pay is superimposed on a regular wage rate which represents a sound average economic rate, the result is bound to be either an inflation in costs, with impairment of demand for the product and reduction of employment, or avoidance of overtime, with reduction of the total wages of regular em-

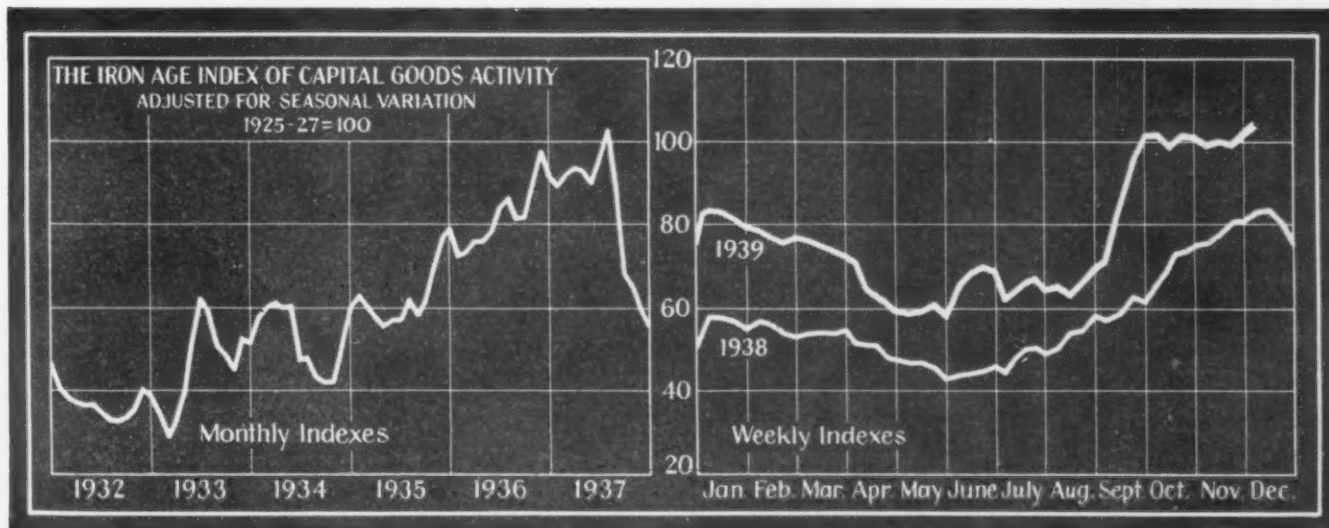
(CONTINUED ON PAGE 99)

PICTURED here (l. to r.) are William B. Warner, president, McCall Corp.; Colby M. Chester, chairman, General Foods Corp.; Howard Coonley, president, National Association of Manufacturers, and Howard Pew, president, Sun Oil Co., attending a session of the 44th annual Congress of American Industry at New York.





District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
CURRENT WEEK..	90.0	93.0	89.0	90.0	88.0	92.0	81.0	95.5	86.0	81.5	90.0	86.5	95.0	91.5
PREVIOUS WEEK..	93.0	94.0	88.0	91.0	87.0	94.5	93.0	95.5	86.0	81.5	90.0	86.5	95.0	93.5



ACCELERATED automobile production, which counteracted several minor losses in other components, pushed THE IRON AGE index of capital goods activity up to 105 for the week ended Dec. 9, a position just one point below the peak of 1937. The spurt in automobile assemblies was due in a large measure to resumption of operations by the Chrysler Corp. Construction activity continues to show a gradual upward trend. Awards of the past week totaled \$57,739,000, representing the 13th consecutive week in which the comparable 1938 values have been exceeded. Activity in the Pittsburgh area has leveled off after a precipitous rise, without precedent in the district's history, which began in early August. Lumber carloadings were off slightly more than seasonal last week, reflecting the slackening in small home

building and repairing which always accompanies the colder weather.

	Week Ended Dec. 9	Week Ended Dec. 2	Comparable Week	
			1938	1929
Steel ingot production ¹	137.8	140.7	95.4	96.2
Automobile production ²	110.5	89.1	99.3	74.4
Construction contracts ³	82.5	81.0	85.4	105.3
Forest products carloadings ⁴	72.2	75.7	61.5	115.8
Production and shipments, Pittsburgh District ⁵	121.9	121.6	72.5	104.5
Combined index	105.0	101.6	82.6	99.2

Sources: ¹ THE IRON AGE; ² Ward's Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. The indexes of forest product carloadings and activity in the Pittsburgh area reflect conditions as of the week ending Dec. 2. Other indexes cover the week of Dec. 9.

... SUMMARY OF THE WEEK ...

... *Moderate decline in new business accompanied by drop in ingot rate.*

o o o

... *Backlogs are being reduced, but are still heavy for first quarter.*

o o o

... *New high record in ingot output; scrap prices are still weak.*

ALTHOUGH new steel business is being received by the mills in gradually diminishing volume, backlogs are still heavy. On sheets, strip and bars in particular many of the mills are quite solidly booked through January and February.

A two-point decline in ingot production to 91½ per cent for this week is partly due to furnace repairs and partly to a relaxing of pressure in some steel rolling departments brought about by a moderate falling off in specifications and the cumulative effect of recent heavy production and shipments.

While evidence is still lacking of burdening inventories in the hands of consumers and distributors, it is apparent that users are less concerned about future supplies than they were a month or two ago. In scattered instances requests have come to the mills to defer until January shipments that were originally scheduled for December.

With speculative factors removed from the market by the virtually unchanged price structure, a closer balance between production and consumption is likely to be arrived at in the coming few months, during which time the trend of operations may be slightly downward. However, the size of backlogs for the first quarter precludes the possibility of a sharp decline. In some steel quarters the view is held that new buying will be relatively light until late January or February, when another buying movement for the second quarter is expected. Present volume of new business is estimated by some companies as equal to 65 or 70 per cent operation, but there may be a further recession in the next few weeks owing to year-end inventory considerations.

Operations are slightly lower in the Pittsburgh, Chicago, Eastern Pennsylvania, Buffalo and Southern Ohio districts and have dropped quite sharply (12 points) in the Wheeling-Weirton area, while small gains have occurred in the Youngstown and Cleveland-Lorain districts. Tin plate production, which has been virtually at capacity, has declined two points to 96 per cent.

A further relaxation in the pressure on the mills would be welcomed by steel companies so that they can catch up on deliveries and perform needed repairing of equipment.

Prospects for 1940 will be enhanced to the extent that foreign business comes to the United States, it being indicated that domestic business alone might not produce a high rate of operations throughout the year. Great Britain reports a heavy export demand for steel, while inquiries here are also substantial.

FURTHER price announcements for first quarter include the reaffirmation of bolt and nut prices except a change on cold punched, hot pressed and semi-finished nuts in which a new classification has been created. Prices of low-carbon ferrochrome have been raised 1c. a lb., but quotations on ferromanganese and other alloys have been reaffirmed.

A decision on Lake Superior iron ore prices for the 1940 season may be arrived at earlier than usual owing to the issuance of an inquiry by the Ford Motor Co. for 200,000 to 250,000 tons of ore some months in advance of its usual appearance.

Most of the pig iron producers are not making formal announcement of first quarter prices, which are unchanged, but are booking business for that period. A fair volume of contracting has been done, but there is no strong rush to buy. Shipments, however, continue in good volume, though they may fall below those of November.

A NEW high record in steel ingot production was attained in November, which had a total of 5,462,616 gross tons of open hearth and Bessemer steel compared with 5,393,821 tons in October, both months having exceeded the previous high record of 5,286,246 tons in May, 1929.

Automobile production may make a fourth quarter record. If the present high volume of assemblies, which last week totaled 115,488, is maintained to the end of December, the fourth quarter total will be the best for that period in the industry's history. The December total would also be the best, with the exception of 1936. Automobile sales continue at high levels. Whether takings of steel will be as large in the first quarter as in this quarter is still in doubt, but representatives of the industry, testifying in Washington last week, stated that there are no large accumulations of steel in automobile plants.

SCRAP prices have declined further in some districts, but there are indications, particularly at Pittsburgh and Chicago, that the bottom of the decline or close to it may have been reached. There has been some weakness at Philadelphia, caused largely by a backing up of export shipments for which there were no available boats, but this situation may be reversed this week as shipments abroad are resumed. A large surplus production of scrap in Detroit has caused weakness there. THE IRON AGE scrap composite price has declined 17c. to \$18.08.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

	Dec. 12, 1939	Dec. 5, 1939	Nov. 14, 1939	Dec. 13, *1938
<i>Per Gross Ton:</i>				
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: No. 5 to 9/32 in. Pittsburgh, Chicago, Cleveland, per lb.	2.00	★2.00	1.92	1.92
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

★Changed to net ton basis.

Finished Steel

<i>Cents Per Lb.:</i>				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.80
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.10	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.10	2.10	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:

	Dec. 12, 1939	Dec. 5, 1939	Nov. 14, 1939	Dec. 13, *1938
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	†\$5.00

*Pittsburgh prices only.

†Applies to 80-rod spools only.

‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:

No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'tl	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:

Heavy melting steel, P'gh.	\$18.75	\$18.75	\$21.25	\$15.75
Heavy melting steel, Phila.	18.75	19.25	20.75	15.25
Heavy melting steel, Ch'go.	16.75	16.75	17.50	13.75
Carwheels, Chicago	16.00	16.00	17.50	12.50
Carwheels, Philadelphia	20.25	20.75	21.25	16.75
No. 1 cast, Pittsburgh	19.25	19.75	21.25	15.50
No. 1 cast, Philadelphia	20.75	20.75	22.25	16.75
No. 1 cast, Ch'go (net ton)	14.50	14.50	15.75	12.50

Coke, Connellsville

Per Net Ton at Oven:

Furnace coke, prompt	\$5.00	\$5.00	\$5.00	\$3.75
Foundry coke, prompt	5.75	5.75	5.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:

Copper, Electrolytic, Conn.	12.50	12.50	12.50	11.25
Copper, Lake, New York	12.50	12.50	12.50	11.375
Tin (Straits), New York	51.50	52.00	**51.00	46.00
Zinc, East St. Louis	6.00	6.00	6.50	4.50
Zinc, New York	6.39	6.39	6.89	4.89
Lead, St. Louis	5.35	5.35	5.35	4.60
Lead, New York	5.50	5.50	5.50	4.75
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

**Nominal.

The Iron Age Composite Prices

Finished Steel

Dec. 12, 1939
One week ago
One month ago
One year ago

2.261c. a Lb.
2.261
2.236
2.286

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1939	2.286c., Jan. 3	2.236c., May 16
1938	2.512c., May 17	2.211c., Oct. 18
1937	2.512c., Mar. 9	2.249c., Jan. 4
1936	2.249c., Dec. 28	2.016c., Mar. 10
1935	2.062c., Oct. 1	2.056c., Jan. 8
1934	2.118c., Apr. 24	1.945c., Jan. 2
1933	1.953c., Oct. 3	1.792c., May 2
1932	1.915c., Sept. 6	1.870c., Mar. 15
1931	1.981c., Jan. 13	1.883c., Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29
1928	2.192c., Dec. 11	2.131c., Jan. 3

Pig Iron

\$22.61 a Gross Ton
22.61
22.61
20.61

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
\$22.61, Sept. 19	\$20.61, Sept. 12	
23.25, June 21	19.61, July 6	
23.25, Mar. 9	20.25, Feb. 16	
19.73, Nov. 24	18.73, Aug. 11	
18.84, Nov. 5	17.83, May 14	
17.90, May 1	16.90, Jan. 27	
16.90, Dec. 5	13.56, Jan. 3	
14.81, Jan. 5	13.56, Dec. 6	
15.90, Jan. 6	14.79, Dec. 15	
18.21, Jan. 7	15.90, Dec. 16	
18.71, May 14	18.21, Dec. 17	
18.59, Nov. 27	17.04, July 24	

Steel Scrap

\$18.08 a Gross Ton
18.25
19.83
14.92

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
\$22.50, Oct. 3	\$14.08, May 16	
15.00, Nov. 22	11.00, June 7	
21.92, Mar. 30	12.92, Nov. 10	
17.75, Dec. 21	12.67, June 9	
13.42, Dec. 10	10.33, Apr. 29	
13.00, Mar. 13	9.50, Sept. 25	
12.25, Aug. 8	6.75, Jan. 3	
8.50, Jan. 12	6.42, July 5	
11.33, Jan. 6	8.50, Dec. 29	
15.00, Feb. 18	11.25, Dec. 3	
17.58, Jan. 29	14.08, Dec. 3	
16.50, Dec. 31	13.08, July 9	

THIS WEEK'S MARKET NEWS

STEEL OPERATIONS

... Rate for industry drops to 91½ per cent as orders decline

ACCOMPANYING a moderate decline in the volume of new steel orders, steel operations have dropped this week to 91½ per cent.

In most districts there has been a reduction in output. The sharpest is in the Wheeling-Weirton area, which is off 12 points to 81 per cent. At Pittsburgh the drop is three points to 90 per cent, Chicago is down one point to 93 per cent, Eastern Pennsylvania is a point lower at 90 per cent, Buffalo is off two and half points to 91 per cent and Southern Ohio is down two and a half points to 79 per cent. Gains of one point each have been made in the Cleveland-Lorain and Youngstown districts.

NEW BUSINESS

... New orders are lighter and backlogs are being reduced

PRODUCERS at PITTSBURGH are experiencing a moderate reduction in unfilled tonnage. This condition has been brought about by three factors—a drop in the volume of incoming specifications, a step-up in steel mill shipments, and the cumulative effect of record steel production. The size of backlogs, however, remains substantial enough to preclude a sharp falling off in steel mill activity in the first quarter, but it is to be expected that mills will make considerable progress in shipping unfilled tonnages during January and February. It is estimated that incoming specifications at the present time would support an operating rate of between 65 and 70 per cent. of capacity, but it is also true that the volume of incoming specifications may recede further over the next few weeks owing to year-end influences and the obvious result of the reaffirmation of major steel products for first quarter delivery.

For the first time in several weeks, all CHICAGO sellers agree that backlogs are being worked-down, although the extent of this reduction varies considerably when certain mills are

compared. It seems certain, however, that this general trend will continue for over the next few weeks, probably until the end of January at least. One large CHICAGO sales office in the first 11 days of December was about 30 per cent behind the same period of November. Another large producer has yet to see anything but a slight decline in its backlog.

Aside from the fact that many CHICAGO district steel consumers have already ordered at least a part of their first quarter requirements, the inventory situation figures prominently in this recent decrease in new business. Many concerns in the Middle West manufacture products which are in particular demand at this time of year. A week or two prior to Christmas, however, production usually slumps sharply at these plants, which means that a 45-day inventory of steel may become a 90 or 120-day inventory in a short time. As a result of this annual situation, Dec. 15 in the opinion of some sellers is a crucial period in the decision as to first quarter needs.

New steel business is reasonably well sustained at CLEVELAND and YOUNGSTOWN, where comfortable order backlogs enable producers to look beyond the next three weeks of seasonal influences adverse to buying. A period of quiet would be advantageous after the long campaign since Labor Day, as it would enable progress toward catching up on shipments, needed repair of certain facilities and better alinement everywhere.

Very little pessimism over first quarter prospects is found at CLEVELAND and YOUNGSTOWN. Activity of domestic consumers will be well maintained, according to present estimates. Export demand for steel and pig iron is expected to pick up after Jan. 1. All the South American countries, Spain, Japan, China and India have heavy requirements.

New business in ST. LOUIS is reported to be extremely light. Users of steel are content to await developments before making further forward commitments, now that deliveries are easier and prices for first quarter are mostly unchanged.

SAN FRANCISCO's water front is still tied up by the CIO ship clerks'

strike halting all steel shipments by privately owned vessels. A sympathy slow-down at Los Angeles where northern California cargoes are being landed for trans-shipment by rail was reported halted on Dec. 9.

In the NEW YORK district there has been a further downward trend in steel orders. An estimate of one company is that volume is about 25 per cent below that of the corresponding period in November, while others say that present business approximates that of last August. There are some who look for light buying until late January or February.

A satisfactory improvement in the automotive ordering, particularly for the first quarter shipment of flat steel, was noted in the SOUTHERN OHIO district during the past week.

The BUFFALO steel market has been quiet during the past week. Most of the regular customers have their orders in and books are filled for January and partly into February. No spot tonnage is available. Bar mills in the district are operating at near-capacity. Structural steel and reinforcing bars are a little quieter.

PRICES

... Some additional announcements for the first quarter

BOLT and nut prices have been reaffirmed except for a minor change in nuts where a new classification has been created, and cap screw and rivet manufacturers are going along with schedules intact.

No announcement has been made as to first quarter prices by the independent plate producers in EASTERN PENNSYLVANIA, who have been quoting 2.35c. a lb., Claymont, Del. However, they are meeting competition at 2.10c. in some cases, while in others are obtaining 2.35c. The 2.35c. price usually rules in cases where particularly quick delivery is asked.

Reinforcing bar prices around ST. LOUIS are weaker, a 40-ton job last week going at \$6 a ton under the market.

Electro Metallurgical Co. last week reaffirmed present base prices for first

quarter business on all its products except ferrochrome. On low-carbon ferrochrome, quotations were raised 1c. a lb., while on the 4 to 6 per cent carbon grade prices were increased ½c. a lb. There were also some minor upward revisions in packaging and crushing charges on several items. Ferromanganese prices were unchanged at \$100 a ton.

PIG IRON

... Some buying has been done for first quarter

SOME pig iron melters have placed contracts for the first quarter. Shipments continue to go out from furnaces at a fairly high rate.

Shipments of CLEVELAND producers up to Dec. 8 were well ahead of the corresponding November period. It is pointed out, however, that December could hardly be expected to maintain this lead clear through the end of the month, due to the holidays. Sales for first quarter are fairly brisk. Heavy export demand is expected in early first quarter.

Although shipments continue ahead of new orders at PITTSBURGH, a fair amount of fresh business is being put on the books. Due to there being no change in quotations, some tonnage now on the books will be carried over into 1940.

December to date in the CHICAGO market is about even with the same period of November as regards pig iron and foundry coke shipments. First quarter books have been opened without announcement and a fair tonnage of \$23 iron has been placed. Most of this higher priced material is spot business but contract buying has also been important. Production and delivery of \$21 pig iron will probably run into the first quarter because of the large amount of covering at this price early in the fall. With the exception of general jobbing foundries nearly all of the shops in the CHICAGO area are well supplied with business.

Lacking incentive to buy and having sufficient supplies on contract to cover requirements well into the coming quarter, foundries in the PHILADELPHIA area are showing very little interest in the market. While the bulk of present shipments to consumers in that area are on the old \$22 base, there are some users who are beginning to eat into the \$24 contracts.

Melters in SOUTHERN OHIO are still slow to cover for the first quarter.

District furnace interests report that only a small percentage of the normal amount of pig iron has so far been booked. No change in the melt has been noted, although a small improvement in the automotive melt is indicated following the ending of labor troubles in the Detroit area.

Some NEW ENGLAND jobbing foundry operations are off from the peak established a short time ago when there was a rush to buy castings against possible price increases. The large foundries, however, are going strong and this month have added to their backlogs. They are now in a position to run full through February, at least, if not another order is booked. The NEW ENGLAND melt is holding at 75 to 80 per cent of capacity.

At BUFFALO shipments have held up fairly well, but new business is not heavy.

Little interest has been shown in first quarter iron by consumers in the NEW YORK area, a fairly large contract tonnage received by one seller this week being the exception to the general situation. Shipments so far this month are running below the same period in November, when water shipments were being rushed before the navigation season closed. Foundries in general are still operating five days a week, but casting orders have slowed up a bit and January operations are expected to be lower. Heater and soil pipe plants are seasonally on the downgrade, while machinery producers continue active. Export inquiries remain light.

STRUCTURAL STEEL

... Awards and new projects are light

STRUCTURAL steel lettings are slightly higher at 16,600 tons compared with 15,080 tons a week ago. The only sizable award is 10,175 tons for a copper refining plant for the Phelps-Dodge Corp. at Morenci, Ariz.

New structural steel projects declined to 14,625 tons from 33,430 tons last week. The only large new jobs reported are 2900 tons for a laboratory at Murray Hill, N. J., for the Bell Telephone Laboratories, Inc., and 1500 tons for a hangar at Denver for the Air Corp.

Among plate awards of 7505 tons is 5900 tons for car floats and lighters for the Pennsylvania Railroad at Staten Island, N. Y.

Structural backlogs at PITTSBURGH

have declined slightly in the past week but plate deliveries are still extended. New Structural inquiries are numerically greater than a week ago while awards are disappointing in some cases.

Bids were opened in the past week for highway projects in Illinois requiring 2600 tons of shapes.

Interest in the Pacific area centers next week on the opening of bids Dec. 20 for two concrete graving docks, Pearl Harbor, T. H., requiring from 6000 to 10,000 tons of H-type piling, several thousand tons of sheet piling, 1600 tons of structural shapes and over 2000 tons of reinforcing steel.

Opening Dec. 15 is the Appraisers Stores and Immigration Station at San Francisco for which upward of 4500 tons of structural shapes and over 3000 tons of reinforcing steel will be required.

SHEETS AND STRIP

... Shipments well in excess of new orders, reducing backlogs

SHEET specifications declined at PITTSBURGH in the past week while shipments, if anything, have increased, thus causing a small downward trend in mill backlogs. The significance of the drop in sheet specifications, however, is offset by the fact that many producers have been turning down flat rolled orders, especially those for hot rolled sheets, for first quarter delivery because of inability to make shipments. Orders for cold rolled sheets are being received at a fair rate but most producers still have room left on first quarter schedules.

Orders are well sustained from all consumers in the CLEVELAND area. Barrel makers in particular are active on gasoline, alcohol, latex and food drums.

CHICAGO mills are receiving new sheet business in considerably less volume than was the case only a few weeks ago, one sales office reporting current sheet bookings as almost nil. Delivery pressure, generally speaking, does not seem to have lessened, however, and it is difficult to obtain shipment of a new cold rolled order before March. Hot rolled unpickled sheets can be rolled and shipped by most Chicago mills in two to four weeks. Some mills, however, are experiencing serious bottlenecks in the pickling department, so that hot rolled pickled sheets are requiring a later delivery

promise. Specifications are relatively heavy from automobile plants and manufacturers of electrical equipment, domestic appliances and steel drums and barrels.

Sheet mills in the SOUTHERN OHIO district are still operating at full capacity, with schedules for January fairly well filled.

Sufficient time has not yet elapsed to test recent base price and extra changes in hot rolled sheets. The new coil extra is understood to have brought complaints from some quarters of the automotive industry where considerable equipment has been installed to handle coils at savings over cut lengths. Steel makers assert the new extra is fully justified.

SEMI-FINISHED STEEL

... Backlogs reduced moderately

INCOMING specifications at PITTSBURGH are running slightly below shipments and, as a result, backlogs have been reduced moderately. This trend is expected to continue on into 1940. The drop in fresh specifications, however, has been in less amount than for the total of all steel products.

MERCHANT BARS

... Backlogs lower but are still substantial

HOT rolled bar bookings and specifications at PITTSBURGH have declined moderately in the past six days, although the present incoming rate of business compares favorably with August experience. For the first time since September, mills have been able to reduce backlogs moderately but the volume of unfilled tonnage remains substantial and curtailment will undoubtedly be a slow process. Automobile companies are the major consumers but demand continues well diversified.

Specifications remain in fair volume but lighter at CLEVELAND. Pressure for shipments continues unabated.

Though one large CHICAGO mill is practically sold up for first quarter, others are receiving inquiries for and quoting February shipment. February in most cases is the earliest delivery a mill can promise on business taken today. Forgers and tractor manufacturers continue to be important factors in that market.

WIRE PRODUCTS

... New business has slackened but backlogs are large

MERCHANT wire specifications at PITTSBURGH continue to slide seasonally, with the result that producers have made substantial headway in reducing backlogs on some items. This condition is welcomed by many producers who are attempting to build up badly depleted mill stocks. On the other hand, however, wire rod and manufacturers' wire specifications are changed but little from a week ago and no material effect has been made on unfilled tonnage volume.

While new business has slackened at CLEVELAND since Dec. 1, comfortable backlogs are held, particularly in manufacturing wire and rods. Export business continues fair at the domestic or higher prices.

CHICAGO wire sellers are putting business on the books for first quarter shipment at a rate little changed from a week ago. Merchant wire demand has slowed considerably because of the difficulty of making farm repairs in cold weather, but this decline has been less than usual since the winter to date in the Middle West has been mild. Industrial consumers continue to seek prompter shipments.

RAILROAD BUYING

... 52,534 freight cars and 288 locomotives ordered in 11 months

NEW orders received by equipment builders from domestic railroads in November totaled 7691 freight cars, 41 locomotives and eight passenger-car trains, according to *Railway Age*. These compare with 11,220 freight cars and 34 locomotives in October and 132 freight cars and three locomotives in November, 1938. Orders received in November for shipment abroad totaled 205 freight cars, four locomotives and 28 passenger-train cars.

The November purchases bring the cumulative totals for the first 11 months up to 52,534 freight cars and 288 locomotives, the publication reports, as compared with 11,973 freight cars and 133 locomotives in the corresponding period of 1938.

Baldwin Locomotive Works is planning to build 28 diesel-electric locomotives for stock. This program will call for an initial investment of more than \$2,000,000 for facilities and material.

The New York Central has been given ICC approval for the sale of \$9,000,000 in equipment trust certificates to the RFC to aid in financing the purchase of 4000 freight cars and five diesel switching locomotives upon the condition that the carrier agree with the RFC that it will spend within one year from Oct. 1, 1939, not less than \$3,600,000 in repairing and reconditioning equipment now owned. The total cost of the equipment to be built will be about \$9,050,100. It will consist of 3500 all-steel 55-ton hopper cars, 300 all-steel 55-ton auto-box cars and 200 all-steel 55-ton box cars to be constructed by Despatch Shops, Inc., the carrier's subsidiary, as well as the locomotives, on which competitive bids were asked.

REINFORCING BARS

*... Awards only 1245 tons ...
Inquiries also light*

REINFORCING steel awards of 1245 tons include no letting of more than 225 tons. New reinforcing steel inquiries call for 3915 tons, all in small lots.

Reinforcing bar specifications at PITTSBURGH have been in good volume recently and are being held down by the inability of producers to find space on rolling mill schedules.

Interest centers on the opening of bids Dec. 15 on the Appraisers Stores and Immigration Station, San Francisco, taking over 3000 tons, and two graving docks at Pearl Harbor, T. H., taking over 2000 tons, Dec. 20.

Price weakness has developed recently at Chicago and St. Louis.

... PLATES ...

... Sales for early delivery still in fair volume

PLATE sales by some independent producers in the past week were equal to 75 per cent of capacity. Some of this business was booked at 2.35c., usually in cases where particularly quick delivery was required, but most of the orders taken for run-of-the-mill positions were at 2.10c., mill. Deliveries of the larger producers continue to shorten and at least one important interest is offering shipment in from two to three weeks. Chief sources of

present bookings are fabricators and warehouses.

Export inquiry from Holland, Scandinavia and South America was a little better in the past week, but little business was booked. Competition from Belgium is still being encountered in South America. German competition in that market, which was extremely active up to a few weeks ago, has now disappeared.

BOLTS, NUTS AND RIVETS

... Prices reaffirmed for first quarter with one slight change

PRODUCERS at CLEVELAND have reaffirmed bolt and nut prices for first quarter of 1940, except for a change in cold punched, hot pressed and semi-finished nuts, where a new classification of 1 3/8 in. and larger has been created with the discount at 60, while 1 1/8 to 1 1/2 in. diameter inclusive remains at 62.

Cap screw manufacturers are reaffirming without change. All manufacturers report a nice volume of business inside their plants, although consumers will be inventory conscious until about Jan. 10.

TUBULAR GOODS

... 25,000-ton line pipe order divided between two makers

THE Panhandle Eastern pipe line order involving 142 miles of 22 and 24 in. line pipe, mentioned here last week and involving approximately 25,000 tons of steel, has been divided between A. O. Smith Corp., Milwaukee, and National Tube Co., Pittsburgh. The line pipe will be used for loops on the company's main line be-

tween Liberal, Kan., and Springfield, Ill. Both oil country goods and standard pipe orders at PITTSBURGH have declined recently as the result of seasonal influences. Some mills are taking this opportunity to begin a program of rebuilding badly depleted stocks.

IRON ORE

... Ford Motor Co. inquires for 200,000 tons or more

AN additional cargo of Canadian ore early this month has raised total season shipments of Lake Superior iron ore to 45,072,725 gross tons. This compares with 19,263,011 tons shipped by vessel in the 1938 season.

Ford Motor Co. in the past 10 days has issued inquiries totaling between 200,000 and 250,000 tons for 1940 shipment. Normally such inquiry would not be received until late in the first quarter.

TIN PLATE

... Operations down two points to 96% ... Buying lags

TIN plate operations this week are estimated at 96 per cent, down two points from a week ago. A moderate decline has occurred in tin plate backlogs and shipments are expected to be substantial in the next two weeks. A comparatively quiet ordering period is expected after the first of the year but normal resumption of buying is looked for by February. Meanwhile, the lag in domestic purchases may be more than offset by export demand which has been more active recently. Minor classification changes have been made in the black plate extra list recently.

NLRB Orders Ford To Deal With UAW

WASHINGTON — For the first time, the National Labor Relations Board has ordered the Ford Motor Co. to bargain with a trade union. In a unanimous decision announced on Dec. 8, the board directed the company to recognize the United Automobile Workers of America, CIO affiliate, and to reinstate about 275 strikers who walked out of the Ford plant at Long Beach, Cal., in April, 1938. In addition the company was told to compensate them for any losses sustained within five days after their applications for reinstatement in the event they are not reinstated or placed on the preferential list.

In its latest order the board said the UAW is entitled to recognition as exclusive bargaining agency for all employees at the Long Beach plant, despite the fact that at the time of the board's hearing the union did not have a single member in good standing among the plant's 393 workers then employed at the plant.

Harnischfeger "Welding Hints"

The Harnischfeger Corp., Milwaukee, has inaugurated a new service known as "Welding Hints" which consists of new and puzzling welding problems together with their solutions. Printed on cards, new additions to the series are made regularly, each card handling a specific problem. Some of the problems dealt with are: The rebuilding of worn parts such as dipper teeth, side cutters, mining machinery, farm implements, etc.; building up of cutting tools; making of welded gears; rebuilding of sprocket teeth; welding of pipe structures; reclaiming of clutch pinions; and fast welding for poor fit joints.

Dow Orders Four-High Mill

United Engineering & Foundry Co. has received an order from the Dow Chemical Co., Midland, Mich., for a wide four-high mill for the cold rolling of Dowmetal sheets. The Dow Chemical Co. produces Dowmetal sheets as well as extruded and die castings.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Dec. 12, 1939	Dec. 5, 1939	Nov. 14, 1939	Dec. 13, 1938	1939	1938
Fabricated structural steel awards	16,600	15,080	14,850	13,250	932,475	872,825
Fabricated plate awards	7,505	.....	150	610	184,855	129,420
Steel sheet piling awards	0	.....	1,500	2,025	74,565	47,310
Reinforcing bar awards	1,245	3,720	9,300	8,000	440,760	332,810
Total Letting of Construction Steel..	25,350	18,800	25,800	23,885	1,632,655	1,382,365

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1935		1936		1937		1938		1939	
	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity	Ship-ments	*Per Cent of Capacity
January	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7	789,305	51.8
February	583,137	39.2	675,315	45.3	1,133,724	82.5	474,723	35.5	677,994	49.3
March	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2	767,910	50.4
April	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7	701,459	47.5
May	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2	723,165	47.4
June	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1	733,433	49.7
July	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8	676,309	44.5
August	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3	803,822	52.7
September	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5	985,030	66.9
October	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1	1,218,545	79.9
November	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6	1,270,894	86.1
December	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2	.....	...
Minus yearly adjust-ment	(-23,750)	...	(-40,859)	...	(-77,113)	...	(+30,381)	...	.....	...
Total for year	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	6,655,749	36.7	.....	...

* Annual finished steel capacity 17,940,600 gross tons, with monthly percentages based on actual number of weeks in each month.

Shipments By U. S. Steel in November Up 52,349 Tons

UNITED STATES STEEL CORP. reports shipments of finished products by its subsidiaries in November totaled 1,270,894 tons, compared with 1,218,545 tons in October,

an increase of 52,349 tons, and with 679,653 tons in November, 1938. For the first 11 months of 1939, shipments were 9,347,866 tons, against 5,931,164 tons in the like period of last year.

Steel-Frame Housing At Ford Development

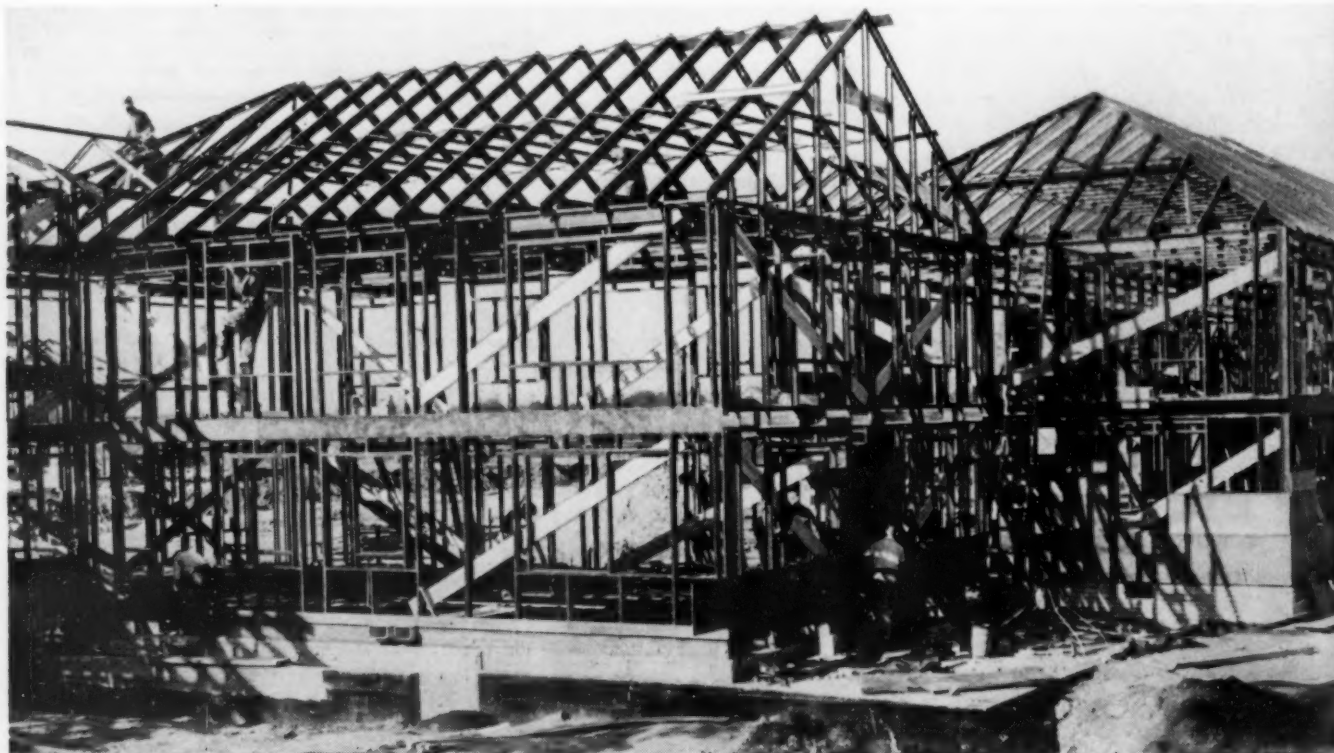
SPEED of erection of large-scale housing projects, framed with steel, is strikingly illustrated in the building project of the Ford Foundation at Dearborn, Mich. The first group of buildings in the project includes 15 apartments and terrace

buildings with accommodations for 203 families and a two-story community center, all of which are using Stran-Steel framing, fabricated by Stran-Steel Division, Great Lakes Steel Corp.

Six days after the Stran-Steel floor

joists were placed on the finished foundation of the first apartment building, consisting of 24 units, the entire steel framework was completed on this building. The framework is now completed on all apartment and terrace units. Approximately 600 tons of framing were used in the initial group of apartments and buildings.

Arthur G. McKee & Co., Cleveland, has declared a regular dividend of 25c. and an extra dividend of 50c., total of 75c. per share on Class "B" stock of the company. This is payable Jan. 2, 1940, to stock of record Dec. 20, 1939. A dividend of 50c. was paid on this stock in the previous quarter. The company reports that it enjoyed a satisfactory volume of business for the present year and that inquiry for new plant construction is heavier at present than at any time in the year.



Leiserson Tried to Clean-Up NLRB, His Testimony Shows

WASHINGTON — Testimony developed by the special House committee investigating the National Labor Relations Board showed this week, as the committee opened a series of public hearings, that since the appointment of William M. Leiserson to the board last June, he has attempted a one-man house cleaning of NLRB personnel and has clashed with other board members, charging that certain "findings of fact" prepared by board subordinates could not be trusted as a basis for decisions.

After reading a prepared statement in which he defended the Wagner Act and denied there is any essential disagreement among the three members of the board, Mr. Leiserson was questioned by Chairman Howard W. Smith, Democrat of Virginia, and vigorous House critic of the NLRB. Figuring prominently in the testimony was a memorandum written by Mr. Leiserson in which he called for the discharge of Nathan Witt, NLRB secretary, and other "amateur detectives" in the secretary's office.

Irregularities Cited

Mr. Leiserson, former chairman of the National Mediation Board, who succeeded Donald Wakefield Smith as a member of the NLRB, told the committee that he had refused to participate in certain cases since being named to the board because of "usual irregu-

larities in the manner in which the secretary's office handled the cases." It was indicated that he could not trust "findings of fact" prepared by board subordinates on which members base their decisions.

In two pending cases in which Mr. Leiserson refused to participate because they were in advanced stages when he took office, there had been an attempt by Board Member Edwin S. Smith, testimony showed, to compel the new member to participate by taking court action or by passing a board resolution.

Earlier in the session, Mr. Leiserson characterized the Wagner Act as "a good law" and expressed the view that no changes are needed "in any important respect." After reviewing the legislative history of the law and developments leading to its enactment, he conceded that there are "faults and weaknesses" in its administration but expressed doubt that the board was responsible. On the contrary, he told the committee, there is a serious question as to whether those who oppose the law are not more responsible for the defects than the board itself.

Wrong to Favor One Union

On the subject of the craft vs. the industrial union principle, one in which observers have detected a swing away from the CIO since he was named to

the board, Mr. Leiserson testified that in his opinion it was "wrong" for the Government to say that one type of labor organization is more effective than another in accomplishing the purposes of collective bargaining. Suggesting that all forms have their advantages and disadvantages, Mr. Leiserson told the committee that Section 9 of the Wagner Act is "rather broad," and appears to leave to the judgment of the board what form of unit is best to insure collective bargaining rights.

It is his opinion, he asserted, that the intent of Congress in this respect was to permit employees to reveal their own preferences in establishing forms of self-organization and collective bargaining relationships with employers. On this basis, the board should make its decisions accordingly, he said, adding that it is a matter of interpretation which can be worked out by more experience in administration with the assistance of the courts.

Mr. Leiserson denied that there is any "essential disagreement" among the three members of the board and likewise denied that he was critical of other board members. He said he believed that rumors to the contrary had been based on the fact that he had written some dissenting opinions. Later in the session, however, there were indications that the "rumors to the contrary" may have a good foundation.

"As a matter of fact," Mr. Leiserson said, "I think some members of the board were worried about what I was going to say."

Program for U. S. Recovery Is Offered By Industrial Congress

(CONTINUED FROM PAGE 90)

ployees. Either result may have serious consequences in interfering with the maximum contribution of industry to the national welfare."

In an address during the congress, E. T. Weir, chairman of National Steel Corp., declared again that American business men do not want war. He said: "What business got out of the last war was dislocation of the entire economic system, punishing taxation and a crushing burden of government debt. These things were major factors in the depression. They made possible the hampering government regimentation and control of business which now exists. It becomes increasingly clear that America must choose peace."

J. H. Van Deventer, editor of THE IRON AGE, told the congress that fear of growing political power has been primarily responsible for the inability of electrical and mechanical power to develop rapidly enough to provide jobs for 10,000,000 men. "One of the causes of our economic slowdown is the fact that we have shortened working hours too fast," he said. "Since 1920, nearly all of the efficiency gains made in industry have gone to labor in the form of increased leisure. Even when weekly wage rates are maintained there can be no increase in purchasing power under this policy. If we had paid these rewards in cash instead of leisure, we would have at least 25 per cent more purchasing power today."

"Instead of availing ourselves of our great resources, our productive facilities, our genius in tested processes for providing work and security, we

have sought other formulae, including security provided by government," Howard Coonley, retiring president of the manufacturers' association, said.

"Whether the future holds in store for us and posterity a free and competitive form of economy and government, or a system of government ownership, government control and central authority, depends in large measure on what is taking place now and what may occur within the near future," William L. Batt, president, SKF Industries, Inc., said.

Paul Garrett, director of public relations for General Motors Corp., declared that the way to strengthen all the things our democracy stands for is to substitute for the murk that goes by the name of propaganda, new propaganda presenting the truth, the whole truth and nothing but the truth about democracy.

FABRICATED STEEL

... Lettings slightly higher at 16,800 tons against 15,080 tons last week ... New projects decline to 14,625 tons from 33,430 tons a week ago ... Plate awards call for 7505 tons.

NORTH ATLANTIC STATES AWARDS

- 515 Tons, Linden, N. J., General Motors Corp., addition to assembly building, to Whitehead & Kales Co., Detroit.
- 450 Tons, Jamaica, N. Y., garage for North Shore Bus Co., to Jones & Laughlin Steel Corp., Pittsburgh.
- 225 Tons, Scranton, Pa., Scranton Lacey Co. building, to Pine Brook Iron Works, Scranton.
- 210 Tons, Pittsburgh, Pa., repairs to 31st Street bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
- 200 Tons, Philadelphia, buildings for Henry Diston & Sons Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 165 Tons, Mount Lebanon, Pa., apartment house for Caste Bros., to South Hills Ornamental Iron & Wire Works, Pittsburgh.
- 135 Tons, Lehigh County, highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 120 Tons, New York, addition to South Street ferry houses, to Schacht Steel Construction Co., New York.
- 115 Tons, Paterson, N. J., Wright Aeronautical foundry extension, to Republic Steel Co., Cleveland.
- 110 Tons, South Boston, Mass., housing project, to West End Iron Works, Cambridge, Mass.
- 100 Tons, Philadelphia, Pa., Kraft-Phoenix Cheese Corp. building, to Belmont Iron Works, Philadelphia.

THE SOUTH

- 475 Tons, Copiah and Simpson Counties, Miss., highway bridge FAS-290B Ct. No. 2, to Nashville Bridge Co., Nashville, Tenn.
- 420 Tons, St. Mary Parish, La., bridge SP-6007, to Nashville Bridge Co., Nashville, Tenn.
- 415 Tons, Louisville, Ky., Woolworth store, to Bedford Foundry & Machine, Bedford, Ind.
- 250 Tons, Cleveland, Fla., Steel Creek State bridges, to Bethlehem Steel Co., Bethlehem, Pa.
- 125 Tons, Dallas County, Tex., bridge FAP-592-B (1) to J. B. Baird Corp., Shreveport, La.

CENTRAL STATES

- 410 Tons, Hammond, Ind., American Maize Product Co., warehouse building, to United Boiler Heating & Foundry Co., Hammond.
- 375 Tons, Crystal Lake, Ill., State bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 340 Tons, Evansville, Ind., Mead-Johnson building, to International Steel & Iron Co., Evansville, Ind.
- 130 Tons, Lafayette County, Mo., bridge FAP-22 (8) to Clinton Bridge Works, Clinton, Iowa.
- 100 Tons, Franklin County, Mo., bridge, FA-279-D (1) to Stupp Bros. Bridge & Iron Works, St. Louis.

WESTERN STATES

- 10,175 Tons, Morenci, Ariz., Phelps-Dodge Co., copper refining plant, to Kansas City Structural Steel Co., Kansas City, Kan.
- 580 Tons, Tongue Point, Ore., Navy Department buildings, to Willamette Iron & Steel Corp., Portland.
- 550 Tons, La Verne, Cal., water softening plant for Metropolitan Water District, to Consolidated Steel Corp., Los Angeles; through Griffith Co. Reported last week as 350 tons.
- 140 Tons, Alameda, Cal., elevated tank at Navy Yard, to Pittsburgh-Des Moines Corp., San Francisco. Tonnage includes plates.
- 100 Tons, Beverly Hills, Cal., South California Telephone Co., Oxford branch, to Columbia Steel Co., San Francisco.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 2900 Tons, Murray Hill, N. J., laboratory for Bell Telephone Laboratories, Inc.

- 500 Tons, Huntington, Mass., State bridge.
- 485 Tons, Cornwall, N. Y., highway project R.C. 4091; bids close Dec. 28.
- 450 Tons, New York, public school No. 114.
- 400 Tons, Erie County, N. Y., State bridge RC-2590.
- 377 Tons, Frankford, N. J., railroad overpass, route S-31; bids to State Highway Department until Dec. 22.
- 350 Tons, Erie County, N. Y., highway bridge and crossing elimination, project R.C. 4080; bids close Dec. 28.
- 290 Tons, Galloway, N. J., including 90 tons reinforcing steel, railroad overpass; bids close Dec. 22.
- 275 Tons, Bellevue, D. C., fuse loading plant, naval magazine, for Bureau Yards and Docks.
- 200 Tons, Orange, Mass., State bridge.
- 200 Tons, New York, towers for International Parachuting Co.
- 200 Tons, Galloway Township, N. J., State overpass.
- 200 Tons, Washington, Massachusetts avenue bridge.
- 200 Tons, West Burlington, Pa., Bradford County home.
- 200 Tons, Malden, Mass., bakery.
- 175 Tons, Dormont, Pa., building addition for Bell Telephone Co.
- 150 Tons, Laurel Hill, N. Y., tin plant for Phelps Dodge Corp.
- 150 Tons, Plaistow-Atkinson, N. H., State bridge, Middlesex Construction Co., Framingham, Mass., contractor.
- 140 Tons, Jamaica-Wardsboro, Vt., two State bridges.
- 140 Tons, Woodbridge, N. J., approaches, Raritan River State bridge.
- 125 Tons, York, Pa., Indian Rock dam for U. S. Engineer's office.
- 124 Tons, Woodbridge, N. J., two highway bridges on route 35; bids close Dec. 22.
- 120 Tons, Camden County, N. J., Cooper River state bridge.
- 112 Tons, Albany County, N. Y., bridge, highway project S.S. 39-25; bids close Dec. 28.
- 110 Tons, Camden County, N. J., bridge over Cooper River; bids close Dec. 22.

CENTRAL STATES

- 2600 Tons, Illinois highway projects, low bidders: 517 tons, Sangamon County, Illinois Steel Bridge Co., Chicago; 150 tons, Cook County, 450 tons, Menard County, and 118 tons, Piatt County, Bethlehem Steel Co.; 1214 tons, Cook County, American Bridge Co.; 193 tons, Logan County, A. F. Anderson Iron Works, Chicago (previously reported).
- 850 Tons, Wasta, S. D., Cheyenne River State bridge.
- 450 Tons, Highland Park, Mich., alterations to plant for Ford Motor Co.
- 300 Tons, Chicago, 220 movable traffic separators for city; bids Dec. 26.
- 265 Tons, Milwaukee, Federal building addition.
- 250 Tons, Milwaukee, addition to post office; bids Dec. 19.
- 200 Tons, Kimball, Neb., State highway bridge; bids Dec. 15.
- 180 Tons, Cedarville, Ind., State bridge No. 1873.
- 120 Tons, Scottsburg, Ind., State bridge No. 1876.

WESTERN STATES

- 1500 Tons, Denver, air corps hangar; bids asked Jan. 3 by quartermaster department, U. S. Army, Denver.
- 700 Tons, Hawthorne, Nev., Nevada Naval ammunition magazines for Bureau Yards and Docks.
- 520 Tons, Crescent City, Cal., Smith River bridge; bids Jan. 3.
- 400 Tons, Anaconda, Mont., roof for flue for Anaconda Copper Mining Co.
- 300 Tons, Los Gatos, Cal., viaduct; bids December 27.

FABRICATED PLATES

AWARDS

- 5900 Tons, Staten Island, N. Y., Pennsylvania Railroad car floats and lighters, to Dravo Contracting Co., Neville Island, Pa., and Sullivan Dry Dock Co.
- 625 Tons, Burbank, Cal., 24 and 30-in. pipe, to Consolidated Steel Corp., Los Angeles.
- 450 Tons, Mare Island, Cal., Navy oil barges, to A. M. Castle & Co., San Francisco.
- 375 Tons, Alhambra, Cal., water tanks, to Southwest Welding & Mfg. Co., Alhambra, Cal.
- 155 Tons, Brooklyn, National Lead Co., two silos, to Chicago Bridge & Iron Co., Chicago.

PENDING PROJECTS

- 275 Tons, Denver, reconstruction of conduit No. 6; bids Dec. 21.

REINFORCING STEEL

... Awards of 1245 tons; 3915 tons in new projects

ATLANTIC STATES

AWARDS

- 188 Tons, Westmoreland County, Pa., Laurel Hill tunnel ventilation building, to Jones & Laughlin Steel Corp., Pittsburgh, through W. N. Dambach, Inc.
- 177 Tons, Fulton County, Pa., Sideling Hill tunnel ventilation building, to Jones & Laughlin Steel Corp., Pittsburgh, through W. N. Dambach, Inc.
- 150 Tons, West Haven, Conn., Armstrong Rubber Co. plant, to Topper & Griggs, Hartford, Conn. Edwin Moss & Son, Inc., Bridgeport, Conn., contractor.

SOUTH AND CENTRAL

- 190 Tons, Roby, Ind., American Maize Products Co., to Joseph T. Ryerson & Son, Inc., Chicago, through Campbell-Lowrie-Lautermilch, contractors.
- 108 Tons, Chicago, superstructure, Lane Technical High School stadium, to Inland Steel Co., Chicago.

WESTERN STATES

- 218 Tons, Oakland, Cal., Coca Cola bottling plant, to Gilmore Steel & Supply Co., San Francisco; through Engineers, Ltd., San Francisco, contractor.
- 212 Tons, Visalia, Cal., junior college buildings, to Kyle & Co., Fresno, Cal.; through Charles L. Hoskins Co., San Diego, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 750 Tons, Baltimore, Armistead Gardens housing; John McShain, low bidder.
- 490 Tons, Cornwall, N. Y., highway project R.C. 4091; bids close Dec. 28.
- 337 Tons, Franklin County, Pa., sections Kr and Br, Pennsylvania Turnpike; R. S. Noonan, low bidder.
- 230 Tons, Atlantic City, N. J., Jonathan Pitney housing project; bids Dec. 18.
- 200 Tons, bars and mesh, North Haven, Conn., State road.
- 165 Tons, Frankford, N. J., railroad overpass, route S-31; bids taken by State Highway Department until Dec. 22.

SOUTH AND CENTRAL

- 250 Tons, Louisville, Ky., Treasury Department, Procurement Division, Invitation 25719; bids Dec. 11.
- 225 Tons, Licking County, Ohio, project No. 261, State highway department; bids Dec. 8.
- 175 Tons, Cook County, Ill., two highway bridges, Leninger Construction Co., Chicago, low bidders on general contract.
- 115 Tons, Cook County, Ill., highway bridge, Kenny Construction Co., Chicago, low bidder on general contract.

WESTERN STATES

- 305 Tons, Crescent City, Cal., Smith River bridge; bids Jan. 3.
- 300 Tons, Oakland, Cal., Campbell Village housing project; bids Dec. 13.
- 214 Tons, Sawyer, Wash., Yakima Project (Invitation A-33905-A); bids Dec. 18.
- 155 Tons, Los Gatos, Cal., viaduct; bids Dec. 27.

... NON-FERROUS ...

... Approach of inventory season limits consumer buying ...
November spelter shipments were 64,407 tons; stocks decline to 61,522 tons ... British remove all price restrictions on tin in Far East; first quarter tin quotas raised to 120 per cent.

NEW YORK—Dec. 12—Outside of an announcement by Great Britain that all price restrictions on tin in the Far East and London had been removed and the boosting of first quarter tin quotas to 120 per cent from the previously announced 100 per cent, the market was a colorless affair all week. The closeness of the inventory season is causing most buyers to refrain from buying any supplies not absolutely essential to immediate production. Daily

copper sales in the past week averaged well below the 1000-ton mark. For the month through Saturday sales totaled only 11,900 tons, or about half the volume of the comparable period of November. December shipments, because of year end considerations, will undoubtedly be substantially below the November level, but producers report considerable pressure for early January delivery. Domestic quotations in the primary market are unchanged at 12.50c. per lb., Connect-

icut Valley, for electrolytic metal. Export demand is very spotty, with the tightness of December metal maintaining quotations for shipment in that month up around 13c. per lb., f.a.s. January deliveries, however, are being quoted at 12.75c. to 12.85c. per lb., f.a.s.

Zinc

The price cut of \$10 a ton instituted a week ago has had no noticeable influence on demand. Prime Western sales in the past week were only 1320 tons and shipments 3867 tons. The market as a whole is following the usual year end pattern and in view of the continued high rate of consumption, it is likely that the early part of January will see a resumption of buying on a moderate scale. The price situation remains split with a large custom smelter offering metal at 6c. per lb., New York, and several other sellers adhering to 6.50c. per lb. Slab shipments in November dropped to 64,407 tons from 73,327 tons in October. Production gained slightly to 53,524 tons from 50,117 tons, but the excess of shipments over production brought another reduction in stocks. At the end of the month reserves stood at 61,522 tons, or less than November's shipments, as against 72,405 tons at the end of October.

Lead

Year end considerations have also moderated the volume of lead buying, but the market technically remains in a very strong position. There was some carlot buying of December deliveries for fill-in purposes, but consumers as a whole are biding the turn of the year before making further commitments. Thus far only 30 per cent of the estimated requirements of January have been covered and sellers are looking for an upturn in sales after the first of the year. Shipments are slowing up, as is normal at this time of the year, but are still in relatively heavy volume. Trade estimates place probable December deliveries at 45,000 tons. Prices are unchanged at 5.50c. per lb., New York.

Tin

The "sit-down" strike of the Far Eastern producers in protest against the £230 maximum price set by Great Britain at the start of the war, ended last week with the removal of all price restrictions in the Far East and London by the British government. The price at those points immediately rose to parity with the price here and sales spurted to close to 840 tons in two days. To all effects simultaneously with this action, the International Tin Committee revised first quarter quotas to 120 per cent from the 100 per cent previously set for the quarter. While domestic consumers have not as yet had an opportunity to digest fully the import of these new developments, there has been a noticeable improvement in inquiry in the past few days, but actual buying is still very light.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Dec. 6	Dec. 7	Dec. 8	Dec. 9	Dec. 11	Dec. 12
Copper, Electrolytic ¹	12.50	12.50	12.50	12.50	12.50	12.50
Copper, Lake	12.50	12.50	12.50	12.50	12.50	12.50
Tin, Straits, New York	51.25	51.00	51.00	...	51.25	51.50
Zinc, East St. Louis ²	6.00	6.00	6.00	6.00	6.00	6.00
Lead, St. Louis ³	5.35	5.35	5.35	5.35	5.35	5.35

¹ Delivered Conn. Valley. Deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

New York Cleveland		
Tin, Straits pig	52.25c.	Nominal
Copper, Lake	13.75c.	Nominal
Copper, electro	14.00c.	Nominal
Copper, castings	13.625c.	Nominal
*Copper sheets, hot-rolled	21.12c.	21.12c.
*Yellow brass sheets ..	19.31c.	19.31c.
*Seamless brass tubes ..	22.06c.	22.06c.
*Seamless copper tubes ..	21.62c.	21.62c.
*Yellow brass rods	15.23c.	15.23c.
Zinc slabs	7.625c.	8.125c.
Zinc sheets, No. 9 casks	12.00c.	12.10c.
Lead, American pig ...	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	31.875c.	Nominal
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33¼; on brass sheets and rods, 40; on brass tubes, 33¼, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible...	10.25c.	10.875c.
Copper, hvy. and wire..	9.25c.	9.625c.
Copper, light and bottoms	8.25c.	8.75c.
Brass, heavy	5.50c.	6.00c.
Brass, light	4.625c.	5.375c.
Hvy. machine composition	8.75c.	9.625c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or comp. turnings	8.625c.	9.125c.
Lead, heavy	4.50c.	4.875c.
Cast aluminum	9.00c.	10.00c.
Sheet aluminum	14.25c.	15.25c.
Zinc	3.125c.	4.375c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$140 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.75c. a lb.

IRON AND STEEL SCRAP

... Composite price of No. 1 steel is lower again this week, at \$18.08, but rate of fall has decreased materially.

DEC. 12—There are several signs pointing to the fact that the bottom of the decline that began two months ago has been reached. The market is no softer this week at Pittsburgh, despite slowly declining mill operations, and sales of No. 1 at Chicago have been in line with last week's quoted price range. Although practically the whole list at Philadelphia has been marked down 50c., based on mill sales, the composite price as a result has fallen only 17c. to \$18.08 as against a drop of 33c. the week before and \$1 for the week before that. Lack of an export market at Philadelphia has been responsible for some of the weakness there, and the absence of boats at New York and other Atlantic ports up until this week has further tended to increase the potential supply for eastern Pennsylvania mills. With a resumption of active export shipments reported this week, the situation should be reversed.

Markets at Cleveland, Buffalo and St. Louis are still on the down grade, although no important mill sales are reported. Weakest part of the picture is railroad steel. Recent substantial sales to brokers have warranted lower quoted prices.
6 pt. to follow

Pittsburgh

The market is no softer than a week ago and some brokers are inclined to feel that for the time being a bottom has been established. Quotations on railroad heavy melting have been substantially clarified in the past 10 days and this grade is now quotable at \$19 to \$19.50, off 50c., on the basis of no small portion of the recent lists having gone to a broker at \$19. No. 1 heavy melting steel remains quotably unchanged at \$18.50 to \$19 and the more or less normal difference of 50c. a ton between No. 1 heavy melting and railroad heavy melting has, for the time being, been reestablished. Cast boring grades continue relatively unchanged as a result of demand for coverages on orders at a nearby steel plant outside of the Pittsburgh scrap market.

Chicago

With the exception of heavy melting steel which two mills have bought for \$17 in the past two weeks, this market is largely nominal. Prices are unchanged from last week throughout the list. Brokers are able to buy freely at \$16.50, with occasional cars at 25c. less. The trade generally believes this market will show a further decline before it rises, though mill operations are almost sure

to continue at near capacity rates for many weeks. A great increase in the scrap supply since Labor Day because of active manufacturing operations is believed to be a factor in this weakness. The North Western sold an accumulation of No. 1 steel recently for around \$16.80 gross delivered a Chicago mill.

Philadelphia

On the basis of several moderate mill purchases made in the past week, steel making grades are quoted off 50c. this week, making No. 1 steel \$18.50 to \$19 and No. 2 steel \$17 to \$17.50. Corresponding adjustments have been made in related items. Current sentiment is that, barring any radical change in existing factors, the resistance point to the present decline will likely be between \$17 and \$18 for No. 1 steel. Inability of exporters in New York to obtain ship space for material already piled up on docks there has resulted in the shipment of some of this material to several district consumers in the recent past. The absence of export shipments from Port Richmond has added about 30,000 tons a month to supplies available to domestic users—a contributing factor to the current weakness.

Youngstown

Scrap is coming out freely here, evidenced by an increased number of cars on sidings and by the fact one leading producer is cutting shipments back wherever possible. Consumption during the next three weeks will be lighter. Prices obtained by the New York Central indicate present published quotations are roughly in line. No change is made this week.

Cleveland

No. 1 heavy melting steel here is quoted \$17.50 to \$18 this week, down 50c. a ton. Other grades reflect the decline, including blast furnace material down \$1. The quoted range of \$11.50 to \$12 on the latter results from a sale to a local mill. Steel on the principal local railroad list is understood to have come in at around \$19 to downstate Ohio mill. Occasional vessel shipments of scrap from Detroit are noted.

Buffalo

The market dipped again this week and values are 50c. lower as mills reduced their offering price on No. 1 heavy melting steel. This grade is now quoted at \$17.50 to \$18, with prevailing differentials in allied grades. No substantial new business has been placed, however.

St. Louis

Steel mills in the St. Louis area refuse to increase their inventories of raw materials until after the turn of the year. This lack of buying has weakened the market, and prices of melting grades are 50c. lower. Rails for rolling are down \$2. Railroad lists: Southern, 10,000 tons;

Missouri Pacific, 1400 tons; Gulf Coast Lines, 850 tons, and Missouri-Kansas-Texas, 700 tons.

Cincinnati

The downward trend of prices in the scrap market has been at least temporarily halted. Reports of better prices on some railroad lists during the past week has brought a more optimistic feeling in some quarters, with dealers indicating that the undertone is a trifle firmer. Dealers activity has been confined largely to covering on old commitments with report of slight premiums offered to scrap producers for prompt shipment.

Detroit

Heavy scrap production by automotive plants has been augmented by the return of Chrysler to production. One of the heaviest lists of the current season comes from Fisher Body plants which will offer 360 cars of bundles on Friday of this week. Consumers in this area are still out of the market and it is believed that about 50,000 tons of scrap has been forced into outside markets in the recent past as a result of lack of new orders in this territory.

Controversy has developed over prices quoted on blast furnace scrap and cast iron but in the absence of a consuming market for most of these materials, recent price reductions appear to have been sympathetic to the general downward movement of open-hearth scrap prices. One exception stands out and that is long turnings on which a quotation of \$6.50 to \$7, or \$1 higher than a week ago, appears to be justified.

Boston

Prices on materials for domestic consumption have declined an additional 25c. to 50c. a ton generally, and those on bundled skeleton \$1.50. Current quotations have made for a fair movement to Pennsylvania. New England steel mills, while going strong, are not buying scrap to any appreciable extent. New England foundries are taking textiles and machinery cast a little more freely at prices averaging \$1 a ton lower.

New York

The restrictions on shipping of export material has been relieved somewhat. At least two boats are loading here this week. Hence buying prices for export scrap are no weaker, though they could hardly be expected to be higher in the face of the still declining domestic market. Prices for material on cars are softer in keeping with the trend in delivered prices at eastern Pennsylvania points. Movement to these points in the past three weeks has been fairly brisk because of the absence of export shipments during that period. No new export sales are reported.

San Francisco

With export buyers coming into the market this week for substantial tonnage, Pacific Coast prices promise to be somewhat bolstered. The export tonnage for heavy melting steel may well be placed at about \$18. After a dip last week the domestic market appears firmer at about \$16 to \$17.50 for No. 1 heavy melting steel.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$18.50 to \$19.00
Railroad heavy melting	19.00 to 19.50
No. 2 heavy melting	17.00 to 17.50
Scrap rails	20.00 to 20.50
Rails 3 ft. and under	22.50 to 23.00
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets	17.50 to 18.00
Heavy steel axle turn	16.50 to 17.00
Machine shop turnings	12.50 to 13.00
Short shov. turnings	14.00 to 14.50
Mixed bor. & turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Cast iron carwheels	19.50 to 20.00
Heavy breakable cast	15.50 to 16.00
No. 1 cupola cast	19.00 to 19.50
RR. knuckles & coup.	23.25 to 23.75
Rail coil springs	23.75 to 24.25
Rail leaf springs	23.75 to 24.25
Rolled steel wheels	23.75 to 24.25
Low phos. billet crops	25.00 to 25.50
Low phos. punchings	22.50 to 23.00
Low phos. heavy plate	22.00 to 23.00
Railroad malleable	20.50 to 21.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$18.50 to \$19.00
No. 2 hvy. mtng. steel	17.00 to 17.50
Hydraulic bund., new	18.50 to 19.00
Hydraulic bund., old	16.00 to 16.50
Steel rails for rolling	22.50 to 23.00
Cast iron carwheels	20.00 to 20.50
Hvy. breakable cast	18.50 to 19.00
No. 1 cast	20.50 to 21.00
Stove plate (steel wks)	16.00 to 16.50
Railroad malleable	22.00
Machine shop turn.	12.00 to 12.50
No. 1 blast furnace	11.50 to 12.00
Cast borings	11.50 to 12.00
Heavy axle turnings	15.00 to 15.50
No. 1 low phos. hvy.	23.00 to 24.00
Couplers & knuckles	23.00 to 23.50
Rolled steel wheels	23.00 to 23.50
Steel axles	23.00 to 23.50
Shafting	23.50 to 24.00
Spec. iron & steel pipe	18.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mtng. steel	\$16.50 to \$17.00
Auto. hvy. mtng. steel	
alloy free	15.50 to 16.00
No. 2 auto steel	12.50 to 13.00
Shovelling steel	16.50 to 17.00
Factory bundles	16.00 to 16.50
Dealers' bundles	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
No. 2 busheling, old	5.50 to 7.00
Rolled carwheels	19.50 to 20.00
Railroad tires, cut	19.75 to 20.25
Railroad leaf springs	19.00 to 19.50
Steel coup. & knuckles	19.00 to 19.50
Axle turnings	15.50 to 16.00
Coil springs	20.00 to 20.50
Axle turn. (elec.)	17.50 to 18.00
Low phos. punchings	20.50 to 21.00
Low phos. plates 12 in. and under	20.00 to 20.50
Cast iron borings	9.00 to 9.50
Short shov. turn.	10.50 to 11.00
Machine shop turn.	9.00 to 9.50
Rerolling rails	19.50 to 20.00
Steel rails under 3 ft.	19.50 to 20.00
Steel rails under 2 ft.	20.00 to 20.50
Angle bars, steel	18.50 to 19.00
Cast iron carwheels	15.75 to 16.25
Railroad malleable	19.00 to 19.50
Agric. malleable	15.00 to 15.50
Per Net Ton	
Iron car axles	22.25 to 22.75
Steel car axles	20.50 to 21.00
Locomotive tires	15.50 to 16.00
Pipes and flues	12.00 to 12.50
No. 1 machinery cast	14.25 to 14.75
Clean auto. cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agric. cast	12.00 to 12.50
Stove plate	10.50 to 11.00
Grate bars	10.50 to 11.00
Brake shoes	12.00 to 12.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$18.50 to \$19.00
No. 2 hvy. mtng. steel	17.50 to 18.00
Low phos. plate	23.50 to 24.00
No. 1 busheling	17.75 to 18.25
Hydraulic bundles	18.00 to 18.50
Machine shop turn	12.50 to 13.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$17.50 to \$18.00
No. 2 hvy. mtng. steel	16.50 to 17.00
Comp. sheet steel	17.25 to 17.75
Light bund. stampings	15.00 to 15.50
Drop forge flashings	16.50 to 17.00
Machine shop turn	11.50 to 12.00
Short shov. turn	12.25 to 12.75
No. 1 busheling	16.75 to 17.25
Steel axle turnings	16.50 to 17.00
Low phos. billet and	
bloom crops	23.50 to 24.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn	11.50 to 12.00
No. 2 busheling	11.50 to 12.00
No. 1 cupola cast	19.50 to 20.00
Railroad grate bars	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	22.00 to 22.50
Rails for rolling	21.00 to 21.50
Railroad malleable	21.00 to 21.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$17.50 to \$18.00
No. 2 hvy. mtng. steel	15.50 to 16.00
Scrap rails	18.00 to 18.50
New hvy. b'ndled sheets	16.00 to 16.50
Old hydraulic bundles	15.00 to 15.50
Drop forge flashings	15.50 to 16.00
No. 1 bushelings	15.50 to 16.00
Machine shop turn	10.00 to 10.50
Shov. turnings	13.50 to 14.00
Mixed bor. & turn	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Knuckles & couplers	22.00 to 23.00
Coil & leaf springs	22.00 to 23.00
Rolled steel wheels	22.00 to 23.00
No. 1 machinery cast	17.50 to 18.00
No. 1 cupola cast	16.50 to 17.00
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	21.50 to 22.00
Cast iron carwheels	18.00 to 18.50
Railroad malleable	19.50 to 20.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$16.50 to \$17.00
No. 1 hvy. melting	15.50 to 16.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	17.00 to 17.50
Misc. stand sec. rails	16.50 to 17.00
Railroad springs	18.50 to 19.00
Bundled sheets	10.50 to 11.00
No. 1 busheling	14.00 to 14.50
Cast bor. & turn	5.50 to 6.00
Machine shop turn	7.00 to 7.50
Heavy turnings	11.50 to 12.00
Rails for rolling	18.00 to 18.50
Steel car axles	19.50 to 20.00
No. 1 RR. wrought	11.50 to 12.00
No. 2 RR. wrought	14.50 to 15.00
Steel rails under 3 ft.	19.50 to 20.00
Steel angle bars	17.00 to 17.50
Cast iron carwheels	18.50 to 19.00
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	17.50 to 18.00
No. 1 railroad cast	16.00 to 16.50
Stove plate	11.00 to 11.50
Grate bars	10.50 to 11.00
Brake shoes	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mtng. steel	\$14.00 to \$14.50
No. 2 hvy. mtng. steel	12.00 to 12.50
Scrap rails for mtng.	18.00 to 18.50
Loose sheet clippings	9.50 to 10.00
Hydrau. b'ndled sheets	13.50 to 14.00
Cast iron borings	5.00 to 5.50
Machine shop turn	6.00 to 6.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	4.00 to 4.50
Rails for rolling	19.50 to 20.00
No. 1 locomotive tires	15.50 to 16.00
Short rails	21.00 to 21.50
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	15.50 to 16.00
Burnt cast	9.00 to 9.50
Stove plate	9.00 to 9.50
Agric. malleable	14.00 to 14.50
Railroad malleable	17.00 to 17.50
Mixed hvy. cast	15.00 to 15.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	\$17.00
No. 1 busheling	14.00
Scrap steel rails	17.50

Long turnings	6.00
Cast iron borings	8.50
Stove plate	11.00
Steel axles	21.00
No. 1 RR. wrought	15.00
Rails for rolling	17.50
No. 1 cast	16.00
No. 2 cast	12.00
Cast iron carwheels	14.00
Steel car wheels	17.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mtng. industrial steel	\$13.00 to \$13.50
No. 2 hvy. mtng. steel	12.00 to 12.50
Borings and turnings	7.00 to 7.50
Long turnings	6.50 to 7.00
Short shov. turnings	8.50 to 9.00
No. 1 machinery cast	13.50 to 14.00
Automotive cast	15.00 to 15.50
Hvy. breakable cast	10.50 to 11.00
Stove plate	9.00 to 9.50
Hydraul. comp. sheets	14.25 to 14.75
New factory bushel	12.50 to 13.00
Sheet clippings	9.25 to 10.25
Flashings	12.25 to 12.75
Low phos. plate scrap	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mtng. steel	\$14.00 to \$14.50
No. 2 hvy. mtng. steel	13.00 to 13.50
Hvy. breakable cast	15.00
No. 1 machinery cast	16.50 to 17.00
No. 2 cast	13.00 to 13.50
Stove plate	12.00 to 12.50
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	19.00 to 20.00
Clean steel turnings*	8.00 to 8.50
Cast borings*	8.00 to 9.00
No. 1 blast furnace	8.00 to 9.00
Cast borings (chem.)	Nominal
Unprepared yard scrap	8.50 to 9.00
Light iron	5.00 to 5.50
Per gross ton, delivered local foundries:	
No. 1 machin. cast	\$20.00 to \$22.00
No. 2 cast	18.50 to 19.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton

Breakable cast	\$12.75 to \$13.00
Machine shop turn	6.75 to 7.00
Mixed bor. & turn	6.25 to 6.50
Bun. skeleton long	9.00 to 9.75
Shafting	17.75 to 18.50
Stove plate	10.50
Cast bor. chemical	9.00 to 9.50
Per gross ton delivered consumers' yards:	
Textile cast	\$16.00 to \$17.00
No. 1 machine cast	16.00 to 17.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mtng. steel	\$14.00
No. 2 steel	\$12.50 to 13.00

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mtng. steel	\$16.00 to \$17.50
No. 2 hvy. mtng. steel	15.00 to 16.50

CANADA

Dealers' buying prices at these yards, per gross ton:

Toronto Montreal	
Low phos. steel	\$12.00 \$11.50
No. 1 hvy. mtng. steel	11.25 10.75
No. 2 hvy. mtng. steel	10.00 9.50
Mixed dealers steel	9.25 8.75
Drop forge flashings	10.25 9.75
New loose clippings	7.00 6.50
Busheling	5.50 5.00
Scrap pipe	8.00 7.50
Steel turnings	6.25 5.75
Cast borings	5.75 5.25
Machinery cast	17.00 17.00
Dealers cast	16.00 16.00
Stove plate	12.00 11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mtng. steel	\$14.50 to \$15.00
No. 2 hvy. mtng. steel	13.00 to 13.50
No. 2 cast	13.00 to 13.50
Stove plate	10.50 to 11.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mtng. steel	\$15.50 to \$16.00
No. 2 hvy. mtng. steel	14.50 to 15.00
Rails (scrap)	15.50 to 16.00
Stove plate	11.50

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mtng. steel	Nominal
No. 2 hvy. mtng. steel	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Rerolling Per Gross Ton \$34.00
Forging quality 40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Open hearth or bessemer Per Gross Ton \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Grooved, universal and sheared Per Lb. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Pittsburgh or Cleveland Per Lb. 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.40c.
Galveston 2.30c.
9/32 in. to 47/64 in. \$3 a net ton higher. Quantity extras apply.

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.15c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.50c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c. to 2.35c.

Philadelphia, del'd 2.15c. to 2.40c.
New York, del'd 2.29c. to 2.54c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'tg. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton \$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton \$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.

Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapolis, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.10c.
Detroit, delivered 2.20c.
Philadelphia, delivered 2.27c.
Granite City 2.20c.
On cars dock Pacific ports 2.60c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 35c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.
Armature 3.55c.

Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus \$50 per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports 4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary \$5.00
Standard cokes, Granite City 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box

Granite City \$4.40
Pittsburgh or Gary 4.30

Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.10c.
Detroit, delivered 2.20c.
On cars dock Pacific ports 2.70c.

Cooperage Stock

Pittsburgh & Chicago 2.20c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15. Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.

Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh and

Cleveland Worcester

	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.70

Base per 100 Lb.

Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Twisted barbless wire	3.40
Woven wire fence, No. 11 and heavier, base col.	70
Woven wire fence, lighter than No. 11, base col.	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool.	\$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool.	\$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Black Galv.	In.	Black Galv.
1/2	56 3/4	1/2	56 3/4
3/4	59 1/2	3/4	59 1/2
1	63 1/2	1	63 1/2
1 1/4	66 1/2	1 1/4	66 1/2
1 1/2	68 1/2	1 1/2	68 1/2

Lap Weld

Dup		Wen			
2	.....61	52½	2	.....30½	15
2½	& 3..64	55½	2½ to 3½	31½	17½
3½	to 6.66	57½	4	.....33½	21
7	& 8.65	55½	4½ to 8.32½	20	
9	& 10.64½	55	9 to 12..28½	15	
11	& 12.63½	54			

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown ..	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati ..	23.06
Northern, delivered, Cincinnati ..	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown ..	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	\$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown ..	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo.....\$28.50

Gray Forge

Valley or Pittsburgh furnace.....\$22.50

Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base
Toronto	
Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.
Per Gross Ton
Domestic, 80% (carload).....\$100.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%.....\$32.00
Domestic, 26 to 28%.....39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size
50% (carload lots, bulk)\$69.50*
50% (ton lots in 50 gal. bbl.).. 80.50*
75% (carload lots, bulk)126.00*
75% (ton lots in 50 gal. bbl.)..139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio
Per Gross Ton
10.00 to 10.50%.....\$32.50
For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.
For each unit of manganese over 2%, \$1 per ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton
F.o.b. Jackson, Ohio, 5.00 to 5.50%\$27.50
For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract
4 to 6% carbon11.00c.*
2% carbon17.50c.*
1% carbon18.50c.*
0.10% carbon20.50c.*
0.06% carbon21.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract
8% carbon\$98.00
2.50% carbon103.00
2% carbon108.00
1% carbon118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads.... \$2.00
Ferrotungsten, 100 lbs. and less 2.25
Ferrovanadium, contract, per lb. contained V., delivered\$2.70 to \$2.90†
Ferrochromium, per lb. contained chromium, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton\$142.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville\$75.00
Ferrochromium, per lb. Mo. f.o.b. furnace95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo. f.o.b. Langeloth, Pa.80c.

* Spot prices are \$5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton
Old range, Bessemer, 51.50%...\$5.25
Old range, non-Bessemer, 51.50% 5.10
Messabi, Bessemer, 51.50%..... 5.10
Messabi, non-Bessemer, 51.50%.. 4.95
High phosphorus, 51.50% 4.85

Foreign Ores*

C.A.J. Philadelphia or Baltimore
Per Unit
Iron, low phos., copper free, 55 to 58% dry, Algeria 13c.
Iron, low phos., Swedish, average, 68½% iron 13c.
Iron, basic or foundry, Swedish, aver. 65% iron..... 11c.
Iron, basic or foundry, Russian, aver. 65% iron.....Nominal
Man., Caucasian, washed 52% 50c.
Man., African, Indian, 44-48% 45c.
Man., African, Indian, 49-51% 45c.
Man., Brazilian, 46 to 48% 44c.

Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered.\$23.00 to \$24.00
Tungsten, domestic, scheelite delivered 23.00 to 25.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)\$18.00
Rhodesian, 45% 22.00
Rhodesian, 48% 25.00
Turkish, 48-49% 29.00
Turkish, 45-46% 24.50
Turkish, 40-41% 22.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%Nominal
48-49%Nominal

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail\$22.00
Domestic, f.o.b. Ohio River landing barges\$22.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.\$20.00 to 22.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid\$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines\$31.00
ditto, in bags, f.o.b., same mines\$32.60

FUEL OIL

Per Gal.
No. 2, f.o.b. Bayonne, N. J....4.375c.
No. 6, f.o.b. Bayonne, N. J.... 2.74c.
No. 5 Bur. Stds., del'd Chicago 3.25c.
No. 6 Bur. Stds., del'd Chicago 2.75c.
No. 3 distillate, del'd Cleve'd. 5.375c.
No. 4 industrial, del'd Cleve'd. 5.125c.
No. 5 industrial, del'd Cleve'd. 4.25c.
No. 6 industrial, del'd Cleve'd. 4.00c.

COKE

Per Net Ton
Furnace, f.o.b. Connells-ville, Prompt\$5.00 to \$5.50
Foundry, f.o.b. Connells-ville, Prompt 5.75 to 6.25
Foundry, by - product Chicago ovens 10.50
Foundry, by - product del'd New England.... 12.50
Foundry, by - product del'd Newark or Jersey City11.38 to 11.90
Foundry, by - product Philadelphia 11.13
Foundry, by- product delivered Cleveland ... 11.05
Foundry, by - product delivered Cincinnati .. 10.50
Foundry, Birmingham.. 7.50
Foundry, by - product del'd St. Louis industrial district10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports 14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.75c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applies to orders of 400 to 1999 lb. On reinforcing bars base applies to orders of less than one ton and includes switching and starting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
*Plates, 1/4 in. and heavier	3.76c.
*Structural shapes	3.75c.
*Soft steel bars, round	3.84c.
Iron bars, Swed. char-coal	9.50c.
**Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
*Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.58c.
*Galv. sheets (24 ga.)	5.23c.
Long ternes (24 ga.)	5.90c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
*Floor plate, 1/4 in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed	4.85c.
Wire, galv. (No. 9)	4.70c.
O. H. spring steel, flats	4.70c.
Common wire nails, per keg	3.50c.

* For lots 400 to 1999 lb.

**For lots less than 1500 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.85c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.
Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.	

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Cold-fin. bars (1500 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.05c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.72c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.75
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

* For 5000 lb. or less.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 400 to 1499 lb.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, 1/4 in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.
The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb., plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.	

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.15c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.70c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	\$60.30
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.90

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.55c.
*Structural shapes	3.55c.
*Soft steel bars small shapes, iron bars (except bands)	3.35c.
†Reinforc. steel bars, square and deformed	2.76c.
Cold-finished steel bars	4.16c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	3.85c.
*Spring steel	5.00c.
*Hot-rolled anneal. sheets	3.55c.
†Galvanized sheets (No. 24)	4.93c.
*Diam. pat. floor plates, 1/4 in.	5.25c.

*For quantities between 400 and 1999 lb.

†For 10 bundles or over.

‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.88
Cold finished bars	4.43
Machine and carriage bolts	.50 & 10 off list
Rivets (structural)	\$4.60 base
On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.	

PACIFIC COAST

	San Francisco	Base per Lb.	
		Los Angeles	Seattle
Plates, tanks and U. M.	4.00c.	3.80c.	3.40c.
Shapes, standard	4.00c.	3.80c.	3.50c.
Soft steel bars..	4.00c.	3.95c.	4.00c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports ..	2.525c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.85c.	4.10c.	3.70c.
Galv. sheets (No. 24 and lighter	5.15c.	5.00c.	4.75c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.00c.	4.75c.
Cold-finished steel			
Rounds	6.80c.	6.60c.	7.00c.
Squares and hexagons ...	8.05c.	7.85c.	8.25c.
Flats	8.55c.	8.35c.	8.25c.
Common wire nails—base per keg less carload	3.25c.	3.25c.	3.15c.

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.58c.
Structural shapes	3.80c.
Plates	3.75c.
Floor plates	5.42c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.34c.
Hot-rolled strip	3.68c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.40c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items. *Price applies only in metropolitan Detroit.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Molybdenum Corp. of America, Inc., 500 Fifth Avenue, New York, has surveys and plans under way for new tungsten ore-concentrating mill in vicinity of Eagle Pass, Tex., to consist of several one-story units, with power house, machine shop and other mechanical structures. Cost estimated close to \$200,000 with equipment.

Ampion Corp., Long Island City, New York, organized to manufacture plastics, resins, etc., has leased a two-story industrial building at Forty-seventh Avenue and Fifth Street, on site 100 x 140 ft., and will improve and occupy for plant.

Purchasing and Contracting Officer, Air Corps, Mitchel Field, Hempstead, L. I., asks bids until Jan. 3 for one hardness tester, one testing table, two penetrators and other equipment (Circular 3).

International Agricultural Corp., 61 Broadway, New York, is arranging financing in amount of \$5,000,000 through sale of new preferred stock and an additional fund through issuance of 650,000 shares of common stock, no par value. At same time company will make change in name to International Chemical & Minerals Corp. This is preliminary to development of potash mining properties and construction of new refining plant in vicinity of Carlsbad, N. M., where company has leased a tract of about 15,000 acres of potash lands. Project is scheduled to be carried out early next year under direction of Union Potash & Chemical Co., Carlsbad, an affiliated organization, with cost estimated close to \$2,500,000 with machinery; of this fund, \$1,500,000 will be furnished by International company.

Great Atlantic & Pacific Tea Co. (A & P Food Stores, Inc.), 420 Lexington Avenue, New York, has begun work on new addition to canning plant of Quaker Maid Co., Terre Haute, Ind., scheduled for completion early in 1940. Cost over \$400,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Dec. 19 for quantity of milling cutters (Circular 298), quantity of grinding wheels (Circular 301); until Dec. 20 for two drill jigs and two milling fixtures (Circular 306).

John F. Trommer, Inc., 1632 Bushwick Avenue, Brooklyn, brewer, will take bids soon on general contract for one-story top addition to branch brewing plant at 119 Hill Street, Orange, N. J. Cost over \$40,000 with equipment. Robert W. Lyster, 221 North LaSalle Street, Chicago, is architect.

Texas Co., 135 East 42nd Street, New York, will take bids soon on general contract for one-story technical laboratory and testing plant at Beacon, N. Y. Cost close to \$50,000 with equipment. Ballinger Co., 105 West Twelfth Street, Philadelphia, is architect.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Dec. 18 for eight motor-driven drill presses (Circular 844); until Jan. 2 for quantity of galvanized steel carriage bolts (Circular 846).

Baker Castor Oil Co., 120 Broadway, New York, has let general contract to James Mitchell, Inc., 575 Westside Avenue, Jersey City, N. J., for two and one-half story and basement addition, 45 x 60 ft., to plant at 35 Avenue A, Bayonne, N. J. Cost close to \$60,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 19 for one motor-driven airless abrasive blasting machine, complete with automatic loader, dust collector and exhaustor (Schedule 12) for Philadelphia Navy Yard; 14 motor-driven airport lens wipers and spare parts (Schedule 32) for Philadelphia and Brooklyn yards; 592 flexible discharge hose assemblies (Schedule 4) for Philadelphia and San Diego navy yards.

Spicer Mfg. Corp., Pottstown, Pa., manufacturer of universal joints and other mechanical equipment, has asked bids on general contract for one-story addition, including improvements in present plant. Cost over \$45,000 with equipment. B. M. Alexander, Reading, Pa., is consulting engineer. Main offices are at Toledo, Ohio.

C. Schmidt & Sons, Inc., 127 Edward Street, Philadelphia, has let general contract to A. Raymond Raff Co., 1635 Thompson Street, for five-story ale storage and distributing building at Sophia and Lydia Streets. Cost about \$100,000 with equipment. H. A. Kuljian & Co., 1518 Walnut Street, are consulting engineers.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Dec. 19 for quantity of gages for percussion primer (Circular 825).

◀ BUFFALO DISTRICT ▶

Eastman Kodak Co., Kodak Park, Rochester, N. Y., has let general contract to Ridge Construction Co., Kodak Park, for one-story addition to Building No. 25. Cost close to \$50,000 with equipment.

Board of Education, Central School District No. 1, Sinclairville, N. Y., asks bids until Dec. 22 for equipment, furniture, etc., for new local school. Raymond A. Freeburg, 1105 West Third Street, Jamestown, N. Y., is architect.

Coca-Cola Bottling Co., Oswego, N. Y., will take bids soon on general contract for one-story mechanical-bottling plant. Cost close to \$45,000 with equipment. Melvin L. and Harry A. King, Denison Building, Syracuse, N. Y., are architects.

◀ WASHINGTON DIST. ▶

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Dec. 21 for quantity of cross bars, blades, chisels, files, drills, drifts, thickness gages, pliers, knives, steel oilers, punches, scrapers and other equipment (Circular 398-74).

Crown Cork & Seal Co., Eastern Avenue and Kresson Street, Baltimore, plans three one-story additions to present buildings Nos. 64, 65 and 66. Superstructure will begin early in 1940. Cost close to \$80,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for six motor-driven bridge cranes for Norfolk Navy Yard, Portsmouth, Va., and Boston Navy Yard (Specifications 9512).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 18 for two circular filters (Circular 358), two vacuum filters (Circular 359), one complete ethylene dryer (Circular 337), two steam and water mixers, two temperature regulators, one pressure gage, two strainers and four steam traps (Circular 354); until Dec. 28 for 14 motor-driven punch presses (Circular 332).

Washington National Airport Commission and Civil Aeronautics Authority, Washington, will take bids early next year for Federal airport at Gravelly Point, partly located in District of Columbia and in Virginia respectively, to include steel hangars, reconditioning and repair shops, oil storage and distributing buildings and other field structures. Proposed to begin work in March.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 18 for three steel forms for reinforced concrete caissons (Schedule 3772); until Dec. 19 for two 42-in. motor-operated gate valves (Schedule 3778); until Dec. 22 for 35,000 lin. ft. of rubber insulated cable, 12,800 lin. ft. of copper cable

for power transmission, 8000 lin. ft. of flexible armored cable, quantity of copper wire, magnet wire, switch contact clips, transformers, etc. (Schedule 3778).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 19 for two motor-driven burring and grinding machines (Schedule 24) for Alexandria, Va., yard; quantity of centrifugal cast, bearing bronze recoil cylinder liners (Schedule 18), quantity of nickel-copper alloy air cylinder forgings (Schedule 17) for Washington yard; three motor-driven turret lathes and equipment (Schedule 15) for Portsmouth Navy Yard.

◀ NEW ENGLAND ▶

Van Norman Machine Tool Co., 160 Wilbraham Avenue, Springfield, Mass., has filed plans for one-story addition, for which general contract has been let to Fred T. Ley Co., Inc., 1215 Main Street. Cost close to \$50,000 with equipment.

United States Engineer Office, Providence, R. I., asks bids until Dec. 19 for pumping machinery and accessories for Plainfield pumping station, Chicopee, Mass., Connecticut River flood control project.

Arrow-Hart & Hegeman Electric Co., Hawthorne Street, Hartford, Conn., electrical products, parts, etc., has let general contract to Bartlett-Brainard Co., 16 Van Dyke Avenue, for one-story addition, 35 x 165 ft.; also for extension to boiler plant. Cost over \$65,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Dec. 19 for two double cut-off sawing machines, one to have gaining attachment (Circular 196), 500 feedway attachments for blank firing (Circular 198).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 19 for one former and layer rope machine, complete with reels (Schedule 27).

Bryant Chucking Grinder Co., Springfield, Vt., is building a manufacturing unit to cost \$50,000 with equipment. Austin Co., 19 Rector Street, New York, is the contractor.

Newman-Crosby Steel Corp., 10 Dern Street, Pawtucket, R. I., has been granted a permit to build a manufacturing plant addition to cost \$28,000 without equipment. The Central Engineering Co., 210 Main Street, Pawtucket, has the contract.

Concord Electric Co., Concord, N. H., will improve and add new equipment to its plant at Sewall's Falls at a cost of about \$600,000. Details will be announced shortly.

◀ WESTERN PA. DIST. ▶

Westinghouse Electric & Mfg. Co., East Pittsburgh, has let general contract to Johnston-McIntyre Co., Sharon, Pa., for one-story addition to branch plant on Sharpville Avenue, Sharon, used for electric transformer production. Cost close to \$80,000 with equipment. M. L. Fawcett is manager at Sharon works.

West Penn Power Co., West Penn Building, Pittsburgh, plans expansion at Windsor steam-electric generating plant, Beechbottom, W. Va., jointly operated with Ohio Power Co., Newark, Ohio, to include installation of new 60,000-kw. turbine-generating unit, high-pressure boilers and auxiliary equipment. This is part of 1940 extension and improvement program of company, for which a total fund of about \$7,000,000 is being arranged, to include other power station expansion, transmission and distributing lines, and other operating facilities.

◀ OHIO AND INDIANA ▶

Cincinnati Butchers Supply Co., 2145 Central Parkway, Cincinnati, manufacturer of refrigerators, fixtures and other store equipment, has asked bids on general contract for modernizing and remodeling former local plant of Worthington Pump & Machinery Corp., Vine Street, Elmwood Place District, including one-story addition, 60 x 360 ft., with

boiler house and office structure. Cost over \$125,000 with equipment. George McDonald, Fountain Square Building, is architect.

Pyramid Rubber Co., South Prospect Street, Ravenna, Ohio, manufacturer of general rubber goods, will take bids soon on general contract for one-story addition, about 60 x 90 ft. Cost close to \$40,000 with equipment.

City Council, Sabina, Ohio, has plans maturing for extensions and improvements in municipal power plant and waterworks station, including installation of new gas engine units and auxiliary equipment. Bond issue of \$60,000 has been authorized for work. Fossick & Hilmer, Union Trust Building, Cincinnati, are consulting engineers.

Commanding Officer, Erie Ordnance Depot, LaCarne, Ohio, asks bids until Dec. 19 for quantity of armored cable, wire connectors, wire racks, sockets, copper wire, switches, etc. (Circular 4).

Jacob Laub Baking Co., 4919 Lorain Avenue, Cleveland, has let general contract to R. S. Ursprung Co., Hanna Building Annex, for one-story addition to baking plant, 120 x 140 ft. Cost over \$60,000 with equipment.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 18 for one motor-driven, contour metal sawing, filing and polishing machine (Circular 728), 162 oil barrel cradle assemblies (Circular 719), quantity of flexible gun post sight assemblies, gun ring sight elevating screws, bearings, screws, springs, etc. (Circular 726), quantity of aircraft nuts, union nuts, etc. (Circular 739); until Dec. 19 for one motor-driven horizontal shaper and one electric belt-driven die-making machine (Circular 746), four oil pumps (Circular 731).

Scherer Electric Co., 444 South Pennsylvania Street, Indianapolis, has asked bids on general contract for new one-story plant, 110 x 125 ft., at 936 South West Street. Cost over \$60,000 with equipment; an overhead crane will be installed. E. C. Doeppers, Rauin Building, is architect.

◀ SOUTH ATLANTIC ▶

Coca-Cola Bottling Co., Atlanta, Ga., plans one-story mechanical-bottling plant at Third Avenue, Hamilton Road and Seventeenth Street, Columbus, Ga. Cost about \$45,000 with equipment.

Public Works Officer, Naval Air Station, Pensacola, Fla., asks bids until Dec. 20 for two 200-hp. watertube boilers with oil-burning equipment, underground fuel oil storage tanks, fuel oil pumping and heating equipment, boiler feed pumps, motor and steam turbine-driven induced draft fan units, soot blowers, piping system and steam distribution system for power plant at new base field at Felton (Specifications 9468).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 19 for one gasoline-operated 10-ton capacity crane for seaplane barge, complete with spare parts and tools (Schedule 22) for Charleston, S. C., yard.

◀ SOUTH CENTRAL ▶

American Brewing Co., 717 Bienville Street, New Orleans, has let general contract to Reimann Construction Co., Maritime Building, for one-story addition to storage and distributing building. Cost about \$40,000 with equipment. Samuel Stone, Jr., & Co., Masonic Temple Building, are architects.

Alabama Power Co., Birmingham, has plans maturing for new steam-electric generating plant at Mobile, Ala., with turbine-generating unit and accessories, high-pressure boilers and auxiliary equipment. Appropriation of about \$2,000,000 is being arranged for this and extensions and improvements in transmission and distributing lines in Mobile area. Work will be carried out in 1940, when company also will expend close to \$1,000,000 for extensions in rural electric system. A gross fund of approximately \$6,000,000 will be used for expansion and improvements in plants and system during coming year.

Tennessee Valley Authority, Knoxville, Tenn., asks bids until Dec. 20 for one sta-

tionary air compressor, 3000 cu. ft. per min. capacity, for construction plant at Kentucky dam; also for similar air compressor, 1500 cu. ft. per min. capacity, with aftercooler for Wheeler dam. Director of Purchases in charge.

Coca-Cola Bottling Co., Springfield, Tenn., has let general contract to Boone Construction Co., Exchange Building, Nashville, Tenn., for one-story mechanical-bottling plant. Cost about \$75,000 with equipment. George D. Waller, Third National Bank Building, Nashville, is architect.

◀ SOUTHWEST ▶

Standard Rendering Co., 635 Adams Street, Kansas City, Kan., will take bids at once on general contract for three-story addition, with one-story unit adjoining for storage and distribution, and boiler plant. Cost close to \$100,000 with equipment. M. H. Doyme, Railway Exchange Building, St. Louis, is consulting engineer.

Union Electric Co. of Missouri, Twelfth and Locust Streets, St. Louis, is arranging appropriation of about \$20,000,000 for expansion and improvements in power plants, power substations, transmission and distributing lines, and other operating facilities, in 1940. Work will include a new steam-electric generating station at Venice, Ill., with ultimate capacity of about 100,000-kw.; also installation of smoke control and abatement equipment in several existing power stations; and extensions and improvements in steam-electric power plant on Ashley Street, St. Louis, with installation of new boilers and other equipment.

United States Engineer Office, Davidson Building, Kansas City, Mo., asks bids until Dec. 19 for 50 to 5000 lbs. of carbon steel castings (Circular 100).

Bennett Aircraft Corp., Love Field, Dallas, Tex., airplanes and parts, plans new one-story plant on local site, 45 x 300 ft., with two wing extensions, for parts production and assembling. Work scheduled to begin early in 1940. Cost over \$80,000 with equipment.

San Antonio Coca-Cola Bottling Co., 123 LaFitte Street, San Antonio, Tex., has asked bids on general contract for one-story addition to bottling works, including improvements in present plant. Cost close to \$45,000 with equipment. Adams & Adams, Insurance Building, are architects; W. E. Simpson, Milam Building, is consulting engineer.

Purchasing and Contracting Officer, Normoyle Quartermaster Depot, San Antonio, Tex., asks bids until Dec. 21 for one heavy-duty type chassis dynamometer, hydraulic power absorption, with complete accessory equipment (Circular 632-5).

◀ MICHIGAN DISTRICT ▶

Muskegon Tool & Die Co., Muskegon, Mich., tools, dies and other mechanical equipment, has let general contract to A. J. Ahlstrom, Muskegon, for one-story addition on Irwin Avenue. Cost close to \$40,000 with equipment.

Howard Flint Ink Co., 2546 Clark Street, Detroit, has asked bids on general contract for new one-story plant, 120 x 280 ft., on Lockwood Drive, Houston, Tex., acquired a number of months ago. Cost about \$100,000 with equipment. New unit will replace existing factory of company at 1 Hamilton Street, Houston. Harley & Ellington, Stroh Building, Detroit, are architects; David M. Duller, Second National Bank Building, Houston, is consulting engineer.

Diamond Power Specialty Corp., 10340 Oakland Street, Detroit, manufacturer of power plant equipment, soot blowers, etc., has let general contract to Bennage & McKinstrie Co., 4612 Woodward Avenue, for two-story addition. Cost reported close to \$45,000 with equipment. Ditchy - Perry - Sidnam, Lincoln Building, are architects.

Holland Hitch Co., Holland, Mich., manufacturer of trailers, parts, etc., has begun erection of one-story addition. Cost close to \$40,000 with equipment.

◀ MIDDLE WEST ▶

American Maize Products Co., 135 South LaSalle Street, Chicago, has let general contract to Campbell-Lowrie & Lautermilch Corp., 400 West Madison Street, for four additions to plant on Sixth Street, Roby, Ind. Cost close to \$250,000 with equipment. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

Edison General Electric Appliance Co., 5600 West Taylor Street, Chicago, has let general contract to Austin Co., Cleveland, for one-story top addition, 61 x 275 ft., at 920-24 South Central Avenue. Cost close to \$60,000. Contractor also is engineer for work.

City Council, Rushford, Minn., plans new municipal light and power plant. Cost estimated about \$80,000. Proposed to use diesel engine-generator units and accessories. Ealy G. Briggs, 1957 University Avenue, St. Paul, Minn., is consulting engineer.

Outagamie Mills, Inc., Kaukauna, Wis., pulp and paper products, is arranging for purchase of local mill, now held by municipality, and will modernize and equip for plant. Cost reported over \$65,000. New company is headed by Milford J. Taylor, 528 North Drew Street, Appleton, Wis., and Daniel E. McCarty, Kaukauna.

Tyler Brothers Coca-Cola Bottling Co., Villisca, Iowa, has let general contract to General Construction Co., Ottumwa, Iowa, for new two-story mechanical-bottling plant, 80 x 104 ft., at Atlantic, Iowa. Cost about \$60,000 with equipment. Dougher, Rich & Woodburn, Old Colony Building, Des Moines, Iowa, are architects.

City Utilities Commission, Kaukauna, Wis., will take bids soon for equipment for municipal hydroelectric power plant, including a 25-ton electric crane, 15-ton electric gate hoist on trolley for lifting penstock gates, power substation equipment, etc. Mead, Ward & Hunt, State Journal Building, Madison, Wis., are consulting engineers.

Stolper Steel Products Co., Milwaukee, is expending \$25,000 in remodeling and renovating a plant it recently acquired at 3220 West Fond du Lac Avenue. The program included remodeling of the first floor of the four-story structure for manufacturing purposes, with the second floor to be used for storage space.

Barrett Equipment Co., St. Louis, manufacturer of fender rolling, brake lining and general automobile and truck tooling machinery, has purchased the one-story building at 2101 Cass Avenue to expand its facilities.

◀ PACIFIC COAST ▶

General Metals Corp., 8901 Railroad Avenue, Oakland, Cal., has let general contract to Empire Construction Co., Russ Building, San Francisco, for one-story addition, 50 x 80 ft. Cost close to \$40,000 with equipment.

Kern County Union High School District, Bakersfield, Cal., has let general contract to Opperman & Co., Bakersfield, for two-story vocational shop at local high school, at \$155,824 exclusive of equipment. Charles H. Biggar, Habersfelde Building, Bakersfield, is architect; Mark Falk, 2835 Gilroy Street, Los Angeles, is engineer.

Purchasing Officer, Bonneville Project, Department of Interior, Portland, asks bids until Dec. 20 for one cooling tower, complete for a 7500-kva. synchronous condenser (Circular 659).

Carstens Packing Co., East Fifteenth and Puyallup Streets, Tacoma, Wash., meat packer, plans one-story addition, including improvements in present plant. Cost close to \$40,000 with equipment. Putnam Engineering Co., 846 South Forty-sixth Street, is engineer.

Boeing Aircraft, Inc., Seattle, a subsidiary of Boeing Airplane Co., same address, has arranged for lease of property of Fisher Body Corp., located on 16-acre tract of land adjoining No. 2 plant of Boeing company, and will improve and equip for large increased production. It will be used primarily for sub-assembling work. This will be third plant of company in city.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Domestic ordering is on a somewhat lower level in most districts reporting, making for greater disparity between domestic and foreign order volume . . . Warner & Swasey salesmen see good first quarter.

Small Drop in Domestic Sales Reported by Cincinnati Builders

CINCINNATI—A small downward fluctuation in the machinery demand in this area was noted during the past week, but manufacturers generally indicate that this is merely a current deflection of interest, and is not indicative of any trend. Of course, normal seasonal influences would tend to bring about an easing at this time of the year in the heretofore brisk demand, although this is expected to be resisted to a great degree by foreign needs. The greatest decline during the current week was in domestic business, foreign demand still holding to reasonably high levels. The disparity between the two types of business was rather broad, but inquiry indicates that domestic interest in retooling is still very extensive. While France and England still seem to predominate in export demand, scattered orders from other European and Asiatic sources, excepting Germany and Russia, are reported.

Local factories are running at full capacity on the day side and some small expansion in night forces is noted. While the labor supply is still limited, the situation is not yet reported to be acute.

Domestic Buying Light In Detroit Area

DETROIT—The rate of incoming new orders for tools and machine tools has declined sharply in the last 30 days. Plants which have not had products of interest to foreign buyers find that domestic volume on their books now will hardly do more than carry them through the first quarter, and they report that business being placed for delivery after March is very light. Some master mechanics say, however, that inability to obtain special machinery will prevent some important changes in 1941 automobile models. They add that important changes are seldom made when retail sales are flourishing, and this appears to be one of those years. Experiments of Ford Motor Co. with a six-cylinder engine are cause for comment, but there is absolutely no trace of machine tool inquiries for this engine yet.

Verification of a report that a large parts company had completed an order for 50,000 trench mortar shells has been obtained, along with information that it is half through a program for manufacture of an additional 150,000 units. This is the only known munitions manufacturing program actually being carried out in Detroit.

The Detroit organization of a company selling chain hoists nationally reports that sales on this item are up 118 per cent, with much business coming from the South and Southwest.

New Orders Slightly Lower In Chicago District

CHICAGO—New order activity seems to be lessening somewhat, though a week-to-week comparison of machine tool sales is not always representative of the true situation. Sales in November in most Chicago sales offices were not far from September's peak record, so that a downward sales curve today is not altogether unexpected, considering the tremendous volume of business already placed. Even though lengthy deliveries are admittedly delaying the placing of orders, inquiries are still being figured and machine tools entered on the books. Small tool buying, on which more reliance may be placed as a trend indicator than upon machine tools, was off slightly from the previous seven-day period. The feeling exists that perhaps this breathing spell will extend through January, with a seasonal spring pickup. It goes without saying that a lull in the rate with which manufacturers have been receiving new orders is welcome. The Chicago ordinance district continues to work on its program of educational orders and production analysis. A number of these orders remain to be placed before June, 1940, when the fiscal year ends and appropriated funds expire.

Warner & Swasey Salesmen See Good First Quarter

CLEVELAND — A satisfactory first quarter for business in general throughout the United States was forecast by 21 salesmen of the Warner & Swasey Co., Cleveland turret lathe manufacturer, who met in Cleveland Dec. 8 and 9 for the company's annual sales conference.

To the question, "What is the outlook for business in general in your territory for the first quarter of 1940?" 16 of the 21 salesmen answered "good" and five answered "fair." Not one thought that business in his territory would be poor. Seventeen of the salesmen rated producer goods industries as "good" and four as "fair"; 11 of the salesmen rated consumer goods industries as "good," and 10 as "fair."

Of particular significance was the fact every one of the 21 salesmen indicated

that today's business reflected actual needs.

"While the replies to the questions submitted to our salesmen represent, of course, only personal opinions," said Charles J. Stilwell, president of Warner & Swasey Co., "we regard them as reasonably authentic, because these men, as sellers of machine tools, are in daily contact with a very wide range of manufacturing industries, and the machine tool requirements of the companies upon whom they call reflect inevitably the nature and the extent of the business now being done and in prospect in those companies.

"By far the most important conclusion to be drawn from these replies is that, although business received a decided impetus from war abroad and defense at home, the major share of our present manufacturing activity is, in fact, founded upon actual current demand for and consumption of the goods and merchandise designed to fulfill the normal peace-time needs of the American people."

Better Diversification of Sales In the East

NEW YORK—With some of the biggest aircraft expansion programs practically completed as far as placement of machine tool orders is concerned, some dealers here report a letdown in order volume in the past week. On the other hand, others indicate that sales are still above normal and are characterized by more diversification as to source than has been apparent for months. Inquiry is active, and there is reason to believe that some of the slackening experienced by some sellers represents a pause before the 1940 budgets become available. Long deliveries have tended to slow up certain commitments, but domestic buyers are being given preference over foreign buyers and some examples of switching are reported.

Russian Iron and Steel Output Declines

ACCORDING to "Industria," the official organ of the Russian metal industries, Russia cannot at present hope to supply Germany with war metals, as she cannot even cope with her own current requirements. The journal reveals that the output of pig iron, steel and rolled steel was lower in October than in October, 1938.

At first a number of furnaces ceased working because of lack of ore. This was followed by a shortage of coke, and then of lime and dolomite. Finally, when this last shortage had been overcome, manganese supplies ran out.

Since Sept. 8 Russia has ceased publishing monthly output figures, but comparisons between August, 1939, and August, 1938, are as follows:

	Aug., 1938	Aug., 1939
	Tons	Tons
Pig iron	1,273,553	1,216,259
Steel	1,462,476	1,426,055
Rolled steel	1,050,435	958,867

PRODUCTS INDEX

BILLETS—Carbon Steel
Andrews Steel Co., The, Newport, Ky.
BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md.
BILLETS—Chrome Steel
Rustless Iron & Steel Corp., Baltimore, Md.
BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel
Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Harrisburg (Pa.) Steel Corp.
Jones & Laughlin Steel Corp., Pittsburgh.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BLANKS—Chisel
Cleveland (Ohio) Punch & Shear Works Co., The.
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The.
1306 Elston Ave.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The.
510 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassett, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. B., Co., 50 Church St., N.Y.C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Blower Corp., 6000 Russell St., Detroit.
Buffalo (N. Y.) Forge Co., 492 Broadway.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 90 East 42nd St., N. Y. C.

BLOWPIPES—Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N. J.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

BOLT CUTTERS
Landis-Mech. Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

BOLT AND NUT MACHINERY
Ajax Mfg. Co., The, Cleveland, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOLTS—Special
Cleveland (Ohio) Cap Screw Co., The.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Stove
Progressive Mfg. Co., Torrington, Conn.

BOLTS—Stove, Recessed Head
American Screw Co., Providence, R. I.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BOLTS AND NUTS
American Screw Co., Providence, R. I.
Clark Bros. Bolt Co., Milldale, Conn.
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., New York City.

BORING BARS
Bullard Co., The, Bridgeport, Conn.
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.
Gairing Tool Co., The, Detroit.
Gisholt Machine Co., Madison, Wisconsin.

BORING, DRILLING & MILLING MACHINES—Horizontal
Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.
Hill-Clarke Mehry, Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond, Ind.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond & Carbide Tools
Heald Machine Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING MACHINES—Precision
Cimatool Co., The, Dayton, Ohio.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

BRAKE LINING & BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
Clark Controller Co., The, Cleveland.
Zutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
Kiekhaefer Corp., Cedarburg, Wis.

BRAKES—Electric & Mechanical
Clark Controller Co., The, Cleveland.
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic
Kiekhaefer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 935 So. 28th St., Milwaukee.

BRAKES—Metal Forming
Bryant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The.
Steelweld Machinery Div., Wickliffe, Ohio.

DRIPS & Krump Mfg. Co., Chicago.
Ferracute Machine Co., Bridgeport, N. J.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRUQUETS—Farroalloy
Electro Metallurgical Sales Corp., 80 East 42nd St., N. Y. C.

BROACHES
Colonial Broach Co., Detroit.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ameco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BUCKETS—Clamshell
Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.
Cullen-Friededt Co., 1303 S. Kilbourn Ave., Chicago.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Steel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic
Packer Machine Co., The, Meriden, Conn.

BUFFING COMPOUND—Stainless & Other Steels
Harrison & Co., Haverhill, Mass.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

BUILDINGS—Rolling Mill Co., Middletown, Ohio.
Belmont Iron Works, Philadelphia.

BLAW-KNOX DIV. OF BLAW-KNOX CO., PITTSBURGH, PA.
Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Cleveland, Ohio.
Cleveland Crane & Engineering Co., The.
Steelweld Machinery Div., Wickliffe, Ohio.

JUST BETWEEN US TWO

Sticks and Stones May . . .

"May I ask," postcards B. R. Hauelsen of Indianapolis, "why you slight your advertisers when it comes to quoting 'stoppers'?" To wit:

SOJUZUGLEEXPORT
Exports of Caucasian Manganese Ore

Compassion, not oversight, is responsible. But very likely our sympathies are wasted, for the chances are that the name runs as trippingly off the Russian tongue as our own tonsil-twisters slide off ours. There are, for instance, Conoquesnessing, Pa., Passadumkeag, Me., Apalachicola, Fla., Wytotitlock, Me., Daguscahonda, Pa., and Chocowinity, N. C.

The Indians are doubtless to blame for most of our screwy names, and it is a shame that when they were dispossessed by their white brothers they were not forced to take their time-wastings tags with them, permitting the introduction of such sensible, efficient names as Abie, Neb., Bovine, Ind., Bear Wallow, Ky., Belcher, La., Topsy, N. C., and Patsy, Mo.

Its Origin Is Horticultural

Our thirst to know how "bloomer" happened to become slang for failure is slaked by C. K. Cairns of Cincinnati. He offers:

"'Bloomer' is a flower or an individual, or anything, that puts forth an early effort to bloom, but gets no further than the blooming stage and thus does not accomplish fruition."

Which gives new significance to the famous poem by the great German poet Heine, Schiller or Goethe, beginning, "Du bist wie eine blomer."

Bees Find Honeysuckle

Veteran buyers of advertising space have a way of making a quick estimate of a publication's influence in its field by counting the pages of classified ads. This is a pretty accurate gage, as the classified ads have to produce direct returns. Your favorite family journal is, of course, in the top spot.

Which reminds us that Don James, our Cleveland editor, is puzzled over this contradictory sentence in a recent Situations Wanted ad:

"Competent, prolific producer in the prime of life (37), with one child."

Orchid

A reader who telephoned the other day for clippings of the two German articles, "The Coming Collapse of German Industry" and "Doing Business Under Hitler," said cryptically, "Damned if you don't figure things out beautifully," and hung up before we could say, "Tell us more."

Wax Works

"Open houses" are seldom ecstatic affairs, but we wish we could have attended the one held by the Decatur Casting Co., Decatur, Ind. For we see by page 62 of the Nov. 30 issue that:

"In addition to finished products, the company displayed completely machined castings. Displays of raw materials used in producing castings and of typical molders, core-makers, chippers and inspectors were also shown."

We hope the typical inspector looked painfully righteous, and a little acid, like "The Bull of the Woods."

He Cut It Down to Boys' Size

Beating us to the gun, Leon Wesley ("This Week in Washington," see page 62) Moffett informs us that once more a linotype operator cut the national debt down to millions simply by dropping three ciphers.

The sterner of the psychologists say there is no such thing as an error. This Mergenthaler Paderewski is simply worried about the national debt and subconsciously fulfilled a wish, which is probably the only way the debt ever will be cut.

Puzzles

We gummed up the Nov. 30 problem badly by mixing the sexes. The first sentence read, "A man is twice as old as his wife was when he was as old as he is now." Change *he* to *she*. Sorry.

Try this on your backward friends:

Ask the subject to hold an odd number of coins in one hand and an even number in the other. Then tell him to multiply the number in his right hand by 2 and the number in his left hand by 3, add the two and give you the total. If the total is odd, the left hand has the odd number of coins. If it's even, the left hand has the even number.

—A.H.D.

PRODUCTS INDEX

BURNERS—Oil or Gas
American Gas Furnace Co., Elizabeth, N. J.

BURNISHING COMPOUNDS
Magnus Chemical Co., 46 South Ave., Garwood, N. J.

BURNISHING MACHINES—Gear
Cimatool Co., The, Dayton, Ohio.

BURNING MACHINES
Cimatool Co., The, Dayton, Ohio.

BUSHINGS—Bronze
Ameco Metal, Inc., Milwaukee, Wisc.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.

BUSHINGS—Dillies
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.

BY-PRODUCTS COKE AND GAS PLANTS
Koppers Co., Engineering & Construction Div., Pittsburgh.

CABINETS—Tool & Parts
Standard Steel Products Co., Poughkeepsie, N. Y.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See
Tramways

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CARBIC
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

CARBIDE—Acid or Heat Resisting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBIDES—Cemented
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.

CARBURIZING—See Heat Treating

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Hoyl & Patterson, Inc., Pittsburgh.

CASE HARDENING—See Heat Treating

CASTERS
Darnell Corp., Ltd., Long Beach, Calif.

CASTINGS—Acid or Heat Resisting
Ameco Metal, Inc., Milwaukee, Wisc.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Alloy Steel
Advance Foundry Co., The, Dayton, Ohio.

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Brass, Bronze, Copper or Aluminum
Bunting Brass & Bronze Co., The, Toledo, Ohio.

CASTINGS—Cast Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Cast Steel
Advance Foundry Co., The, Dayton, Ohio.

CASTINGS—Corrosion Resisting
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Die
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Continental Roll & Steel Foundry Co., East Chicago, Ind.

CASTINGS—High Test & Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Magnesium Alloys
American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.

CASTINGS—Malleable
Canton (Ohio) Malleable Iron Co., The, Lakeside Ave., Cleveland.

CASTINGS—Manganese, Steel and Alloy
Pettibone Mulliken Corp., Chicago.

CASTINGS—Monel & Nickel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Semi-Steel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Steel
American Rolling Mill Co., Middletown, Ohio.

CASTINGS—Tool & Parts
Standard Steel Products Co., Poughkeepsie, N. Y.

CASTINGS—Wrought Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

National-Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, Ohio.

CASTINGS—Gray Iron
Advance Foundry Co., The, Dayton, Ohio.

CASTINGS—High Test & Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Magnesium Alloys
American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.

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Canton (Ohio) Malleable Iron Co., The, Lakeside Ave., Cleveland.

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Pettibone Mulliken Corp., Chicago.

CASTINGS—Monel & Nickel
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Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Steel
American Rolling Mill Co., Middletown, Ohio.

CASTINGS—Tool & Parts
Standard Steel Products Co., Poughkeepsie, N. Y.

CASTINGS—Wrought Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CHEMICALS—Industrial
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Alrose Chemical Co., Cranston, Providence, R. I.

CHEMICALS—Rust Proofing
Parker Rust Proof Co., 2186 Milwaukee Ave., Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHROMIUM — Plating — See Plating — Chromium

CHRONOGRAPHS
Stillman, M. J., Co., Inc., Chicago.

CHUCKING MACHINES—Automatic
New Britain-Gridley Machine Div., The, New Britain Machine Co., New Britain, Conn.

CHUCKING MACHINES—Multiple
Baird Mch. Co., The, Bridgeport, Conn.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The, Millers Falls Co., Greenfield, Mass.

CHUCKS—Magnetic
Brown & Sharpe Mfg. Co., Providence, R. I.

CHUCKS—Magnetic
Held Machine Co., Worcester, Mass.

CHUCKS—Magnetic
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

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Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

COMPOUNDS—Drawing and Cutting
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

COMPOUNDS—Drawing and Cutting
Magnus Chemical Co., 46 South Ave., Garwood, N. J.

COMPOUNDS—Drawing and Cutting
Ponola, Inc., Pittsburgh.

COMPOUNDS—Drawing and Cutting
Standard Oil Co. (Indiana), Chicago.

COMPOUNDS—Drawing and Cutting
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

COMPRESSORS—Air
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

COMPRESSORS—Air
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONDENSERS—Surface & Jet
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CONDENSERS—Surface & Jet
Worthington Pump & Machinery Corp., Harrison, N. J.

CONTACTS—Electrical
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLLERS—Crane
Clark Controller Co., The, Cleveland.

CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Crane
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.

CONTROLLERS—Electric
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia.

CONTROLS—Time Cycle
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

CONVEYING AND ELEVATING MACHINERY
Farquhar, A. B., Co., Ltd., York, Pa.

CONVEYOR BELTS
Hoyl & Patterson, Inc., Pittsburgh.

CONVEYOR BELTS
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

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